

## SEQUENCE LISTING

&lt;110&gt; ffrench-Constant, Richard

Waterfield, Nicholas

&lt;120&gt; DNA Sequences from tcd Genomic Region of Photorhabdus luminescens

&lt;130&gt; 62878

&lt;160&gt; 16

&lt;170&gt; PatentIn version 3.0

&lt;210&gt; 1

&lt;211&gt; 7551

&lt;212&gt; DNA

&lt;213&gt; Photorhabdus luminescens

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(7548)

&lt;400&gt; 1

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1				5					10					15		

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Gly	Phe	Asn	Cys	Leu	Thr	Asp	Ile	Ser	His	Ser	Ser	Phe	Asn	Glu	Phe	
			20					25					30			

cgc	cag	caa	gta	tct	gag	cac	ctc	tcc	tg	tcc	gaa	aca	cac	gac	tta	144
Arg	Gln	Gln	Val	Ser	Glu	His	Leu	Ser	Trp	Ser	Glu	Thr	His	Asp	Leu	
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tat	cat	gat	gca	caa	cag	gca	caa	aag	gat	aat	cgc	ctg	tat	gaa	gcg	192
Tyr	His	Asp	Ala	Gln	Gln	Ala	Gln	Lys	Asp	Asn	Arg	Leu	Tyr	Glu	Ala	
	50					55					60					

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Arg	Ile	Leu	Lys	Arg	Ala	Asn	Pro	Gln	Leu	Gln	Asn	Ala	Val	His	Leu	
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Ala	Ile	Leu	Ala	Pro	Asn	Ala	Glu	Leu	Ile	Gly	Tyr	Asn	Asn	Gln	Phe	
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agc	ggt	aga	gcc	agt	caa	tat	gtt	gcg	ccg	ggt	acc	gtt	tct	tcc	atg	336
Ser	Gly	Arg	Ala	Ser	Gln	Tyr	Val	Ala	Pro	Gly	Thr	Val	Ser	Ser	Met	
			100					105						110		

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Phe	Ser	Pro	Ala	Ala	Tyr	Leu	Thr	Glu	Leu	Tyr	Arg	Glu	Ala	Arg	Asn	
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Leu	His	Ala	Ser	Asp	Ser	Val	Tyr	Tyr	Leu	Asp	Thr	Arg	Arg	Pro	Asp		
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Thr	Leu	Ser	Leu	Ser	Asn	Glu	Leu	Leu	Leu	Glu	Ser	Ile	Lys	Thr	Glu		
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Ser	Lys	Leu	Glu	Asn	Tyr	Thr	Lys	Val	Met	Glu	Met	Leu	Ser	Thr	Phe		
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Pro	Ala	Ile	Ala	Gly	Leu	Met	His	Gln	Ala	Ser	Leu	Leu	Gly	Ile	Asn		
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gct	tca	atc	tcg	cct	gag	cta	ttt	aat	att	ctg	acg	gag	gag	att	acc	768	
Ala	Ser	Ile	Ser	Pro	Glu	Leu	Phe	Asn	Ile	Leu	Thr	Glu	Glu	Ile	Thr		
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gaa	ggg	aat	gct	gag	gaa	ctt	tat	aag	aaa	aat	ttt	ggg	aat	atc	gaa	816	
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Pro	Ala	Ser	Leu	Ala	Met	Pro	Glu	Tyr	Leu	Lys	Arg	Tyr	Tyr	Asn	Leu		
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Tyr	Arg	Leu	Asp	Tyr	Lys	Phe	Lys	Asn	Phe	Tyr	Asn	Ala	Ser	Tyr	Leu		
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Ser	Ile	Lys	Leu	Asn	Asp	Lys	Arg	Glu	Leu	Val	Arg	Thr	Glu	Gly	Ala		
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Pro 385	Gln	Val	Asn	Ile	Glu 390	Tyr	Ser	Ala	Asn	Ile 395	Thr	Leu	Asn	Thr	Ala 400	
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ggc Gly	tct Ser	tgg Trp	gca Ala	tat Tyr	gcc Ala	gcc Ala	gca Ala	aaa Lys	ttt Phe	acc Thr	ggt Val	gaa Glu	gag Glu	tat Tyr	aac Asn	1296
caa Gln	tac Tyr	tct Ser	ttt Phe	ctg Leu	cta Leu	aaa Lys	ctt Leu	aac Asn	aag Lys	gct Ala	att Ile	cgt Arg	cta Leu	tca Ser	cgt Arg	1344
gcg Ala	aca Thr	gaa Glu	ttg Leu	tca Ser	ccc Pro	acg Thr	att Ile	ctg Leu	gaa Glu	ggc Gly	att Ile	gtg Val	cgc Arg	agt Ser	gtt Val	1392
aat Asn	cta Leu	caa Gln	ctg Leu	gat Asp	atc Ile	aac Asn	aca Thr	gac Asp	gta Val	tta Leu	ggc Gly	aaa Lys	ggt Val	ttt Phe	ctg Leu	1440
act Thr	aaa Lys	tat Tyr	tat Tyr	atg Met	cag Gln	cgt Arg	tat Tyr	gct Ala	att Ile	cat His	gct Ala	gaa Glu	act Thr	gcc Ala	ctg Leu	1488
ata Ile	cta Leu	tgc Cys	aac Asn	gcg Ala	cct Pro	att Ile	tca Ser	caa Gln	cgt Arg	tca Ser	tat Tyr	gat Asp	aat Asn	caa Gln	cct Pro	1536
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gat Asp	tgg Trp	cga Arg	aaa Lys	acc Thr	ata Ile	ctt Leu	aag Lys	cgt Arg	gca Ala	ttt Phe	aat Asn	att Ile	gat Asp	gat Asp	gtc Val	1680
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aaa Lys	att Ile	aaa Lys	aat Asn	aac Asn	cta Leu	aag Lys	aat Asn	ctt Leu	tcc Ser	aat Asn	tta Leu	tat Tyr	att Ile	gga Gly	aaa Lys	1776
tta Leu	ctg Leu	gca Ala	gat Asp	att Ile	cat His	caa Gln	tta Leu	acc Thr	att Ile	gat Asp	gaa Glu	ctg Leu	gat Asp	tta Leu	tta Leu	1824
ctg Leu	att Ile	gcc Ala	gta Val	ggc Gly	gaa Glu	gga Gly	aaa Lys	act Thr	aat Asn	tta Leu	tcc Ser	gct Ala	atc Ile	agt Ser	gat Asp	1872
aag Lys	caa Gln	ttg Leu	gct Ala	acc Thr	ctg Leu	atc Ile	aga Arg	aaa Lys	ctc Leu	aat Asn	act Thr	att Ile	acc Thr	agc Ser	tgg Trp	1920
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Thr	Ser	Tyr	Asn	Lys	Thr	Leu	Thr	Pro	Glu	Ile	Lys	Asn	Leu	Leu	Asp		
			660					665					670				
acc	gtc	tac	cac	ggg	tta	caa	ggg	ttt	gat	aaa	gac	aaa	gca	gat	ttg		2064
Thr	Val	Tyr	His	Gly	Leu	Gln	Gly	Phe	Asp	Lys	Asp	Lys	Ala	Asp	Leu		
		675					680					685					
cta	cat	gtc	atg	gcg	ccc	tat	att	gcg	gcc	acc	ttg	caa	tta	tca	tcg		2112
Leu	His	Val	Met	Ala	Pro	Tyr	Ile	Ala	Ala	Thr	Leu	Gln	Leu	Ser	Ser		
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gaa	aat	gtc	gcc	cac	tcg	gta	ctc	ctt	tgg	gca	gat	aag	tta	cag	ccc		2160
Glu	Asn	Val	Ala	His		Val	Leu	Leu	Trp	Ala	Asp	Lys	Leu	Gln	Pro		
705					710				715						720		
ggc	gac	ggc	gca	atg	aca	gca	gaa	aaa	ttc	tgg	gac	tgg	ttg	aat	act		2208
Gly	Asp	Gly	Ala	Met	Thr	Ala	Glu	Lys	Phe	Trp	Asp	Trp	Leu	Asn	Thr		
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Lys	Tyr	Thr	Pro	Gly	Ser	Ser	Glu	Ala	Val	Glu	Thr	Gln	Glu	His	Ile		
			740					745					750				
gtt	cag	tat	tgt	cag	gct	ctg	gca	caa	ttg	gaa	atg	gtt	tac	cat	tcc		2304
Val	Gln	Tyr	Cys	Gln	Ala	Leu	Ala	Gln	Leu	Glu	Met	Val	Tyr	His	Ser		
		755					760					765					
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Met	Phe	Gly	Ala	Ala	Thr	Gly	Ala	Ala	Pro	Ala	His	Asp	Ala	Leu	Ser		
					790				795					800			
ctg	att	atg	ctg	aca	cgt	ttt	gcg	gat	tgg	gtg	aac	gca	cta	ggc	gaa		2448
Leu	Ile	Met	Leu	Thr	Arg	Phe	Ala	Asp	Trp	Val	Asn	Ala	Leu	Gly	Glu		
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aaa	gcg	tcc	tcg	gtg	cta	gcg	gca	ttt	gaa	gct	aac	tcg	tta	acg	gca		2496
Lys	Ala	Ser	Ser	Val	Leu	Ala	Ala	Phe	Glu	Ala	Asn	Ser	Leu	Thr	Ala		
			820					825					830				
gaa	caa	ctg	gct	gat	gcc	atg	aat	ctt	gat	gct	aat	ttg	ctg	ttg	caa		2544
Glu	Gln	Leu	Ala	Asp	Ala	Met	Asn	Leu	Asp	Ala	Asn	Leu	Leu	Leu	Gln		
		835					840					845					
gcc	agt	att	caa	gca	caa	aat	cat	caa	cat	ctt	ccc	cca	gta	act	cca		2592
Ala	Ser	Ile	Gln	Ala	Gln	Asn	His	Gln	His	Leu	Pro	Pro	Val	Thr	Pro		
	850					855					860						
gaa	aat	gcg	ttc	tcc	tgt	tgg	aca	tct	atc	aat	act	atc	ctg	caa	tgg		2640
Glu	Asn	Ala	Phe	Ser	Cys	Trp	Thr	Ser	Ile	Asn	Thr	Ile	Leu	Gln	Trp		
	865				870				875					880			
gtt	aat	gtc	gca	caa	caa	ttg	aat	gtc	gcc	cca	cag	ggc	gtt	tcc	gct		2688
Val	Asn	Val	Ala	Gln	Gln	Leu	Asn	Val	Ala	Pro	Gln	Gly	Val	Ser	Ala		
				885					890					895			
ttg	gtc	ggg	ctg	gat	tat	att	caa	tca	atg	aaa	gag	aca	ccg	acc	tat		2736

Leu Val Gly	Leu Asp Tyr	Ile Gln Ser	Met Lys Glu	Thr Pro Thr	Tyr	
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gcc cag tgg	gaa aac gcg	gca ggc gta	tta acc gcc	ggg ttg aat	tca	2784
Ala Gln Trp	Glu Asn Ala	Ala Gly Val	Leu Thr Ala	Gly Leu Asn	Ser	
915		920		925		
caa cag gct	aat aca tta	cac gct ttt	ctg gat gaa	tct cgc agt	gcc	2832
Gln Gln Ala	Asn Thr Leu	His Ala Phe	Leu Asp Glu	Ser Arg Ser	Ala	
930		935		940		
gca tta agc	acc tac tat	atc cgt caa	gtc gcc aag	gca gcg gcg	gct	2880
Ala Leu Ser	Thr Tyr Tyr	Ile Arg Gln	Val Ala Lys	Ala Ala Ala	Ala	
945		950		955	960	
att aaa agc	cgt gat gac	ttg tat caa	tac tta ctg	att gat aat	cag	2928
Ile Lys Ser	Arg Asp Leu	Tyr Gln Tyr	Leu Leu Ile	Asp Asn Gln		
	965		970	975		
gtt tct gcg	gca ata aaa	acc acc cgg	atc gcc gaa	gcc att gcc	agt	2976
Val Ser Ala	Ala Ile Lys	Thr Thr Arg	Ile Ala Glu	Ala Ile Ala	Ser	
	980		985	990		
att caa ctg	tac gtc aac	cgg gca ttg	gaa aat gtg	gaa gaa aat	gcc	3024
Ile Gln Leu	Tyr Val Asn	Arg Ala Leu	Glu Asn Val	Glu Glu Asn	Ala	
	995		1000	1005		
aat tcg ggg	gtt atc agc	cgc caa ttc	ttt atc gac	tgg gac aaa		3069
Asn Ser Gly	Val Ile Ser	Arg Gln Phe	Phe Ile Asp	Trp Asp Lys		
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Tyr Asn Lys	Arg Tyr Ser	Thr Trp Ala	Gly Val Ser	Gln Leu Val		
1025		1030		1035		
tac tac ccg	gaa aac tat	att gat ccg	acc atg cgt	atc gga caa		3159
Tyr Tyr Pro	Glu Asn Tyr	Ile Asp Pro	Thr Met Arg	Ile Gly Gln		
1040		1045		1050		
acc aaa atg	atg gac gca	tta ctg caa	tcc gtc agc	caa agc caa		3204
Thr Lys Met	Met Asp Ala	Leu Leu Gln	Ser Val Ser	Gln Ser Gln		
1055		1060		1065		
tta aac gcc	gat acc gtc	gaa gat gcc	ttt atg tct	tat ctg aca		3249
Leu Asn Ala	Asp Thr Val	Glu Asp Ala	Phe Met Ser	Tyr Leu Thr		
1070		1075		1080		
tcg ttt gaa	caa gtg gct	aat ctt aaa	gtt att agc	gca tat cac		3294
Ser Phe Glu	Gln Val Ala	Asn Leu Lys	Val Ile Ser	Ala Tyr His		
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gat aat att	aat aac gat	caa ggg ctg	acc tat ttt	atc gga ctc		3339
Asp Asn Ile	Asn Asn Asp	Gln Gly Leu	Thr Tyr Phe	Ile Gly Leu		
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agt gaa act	gat gcc ggt	gaa tat tat	tgg cgc agt	gtc gat cac		3384
Ser Glu Thr	Asp Ala Gly	Glu Tyr Tyr	Trp Arg Ser	Val Asp His		
1115		1120		1125		
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Ser Lys Phe	Asn Asp Gly	Lys Phe Ala	Ala Asn Ala	Trp Ser Glu		
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tgg cat aaa	att gat tgt	cca att aac	cct tat aaa	agc act atc		3474

Trp	His	Lys	Ile	Asp	Cys	Pro	Ile	Asn	Pro	Tyr	Lys	Ser	Thr	Ile	
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Arg	Pro	Val	Ile	Tyr	Lys	Ser	Arg	Leu	Tyr	Leu	Leu	Trp	Leu	Glu	
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caa	aag	gag	atc	acc	aaa	cag	aca	gga	aat	agt	aaa	gat	ggc	tat	3564
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Gln	Thr	Glu	Thr	Asp	Tyr	Arg	Tyr	Glu	Leu	Lys	Leu	Ala	His	Ile	
	1190					1195					1200				
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Arg	Tyr	Asp	Gly	Thr	Trp	Asn	Thr	Pro	Ile	Thr	Phe	Asp	Val	Asn	
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Lys	Lys	Ile	Ser	Glu	Leu	Lys	Leu	Glu	Lys	Asn	Arg	Ala	Pro	Gly	
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Leu	Tyr	Cys	Ala	Gly	Tyr	Gln	Gly	Glu	Asp	Thr	Leu	Leu	Val	Met	
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ttt	tat	aac	caa	caa	gac	aca	cta	gat	agt	tat	aaa	aac	gct	tca	3789
Phe	Tyr	Asn	Gln	Gln	Asp	Thr	Leu	Asp	Ser	Tyr	Lys	Asn	Ala	Ser	
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Met	Gln	Gly	Leu	Tyr	Ile	Phe	Ala	Asp	Met	Ala	Ser	Lys	Asp	Met	
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acc	cca	gaa	cag	agc	aat	gtt	tat	cgg	gat	aat	agc	tat	caa	caa	3879
Thr	Pro	Glu	Gln	Ser	Asn	Val	Tyr	Arg	Asp	Asn	Ser	Tyr	Gln	Gln	
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Phe	Asp	Thr	Asn	Asn	Val	Arg	Arg	Val	Asn	Asn	Arg	Tyr	Ala	Glu	
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Asp	Tyr	Glu	Ile	Pro	Ser	Ser	Val	Ser	Ser	Arg	Lys	Asp	Tyr	Gly	
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Trp	Gly	Asp	Tyr	Tyr	Leu	Ser	Met	Val	Tyr	Asn	Gly	Asp	Ile	Pro	
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Thr	Ile	Asn	Tyr	Lys	Ala	Ala	Ser	Ser	Asp	Leu	Lys	Ile	Tyr	Ile	
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Lys	Phe	Ile	Val	Tyr	Thr	Ser	Leu	Gly	Val	Asn	Pro	Asn	Asn	Ser	
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Val	Asp	Asn	Asn	Ser	His	Ile	Ile	Tyr	Ser	Gly	Gln	Leu	Thr	Asp		
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Thr	Asn	Ile	Asn	Ile	Thr	Leu	Phe	Ile	Pro	Leu	Asp	Asp	Val	Pro		
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Leu	Asn	Gln	Asp	Tyr	His	Ala	Lys	Val	Tyr	Met	Thr	Phe	Lys	Lys		
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Ser	Pro	Ser	Asp	Gly	Thr	Trp	Trp	Gly	Pro	His	Phe	Val	Arg	Asp		
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Asp	Lys	Gly	Ile	Val	Thr	Ile	Asn	Pro	Lys	Ser	Ile	Leu	Thr	His		
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Tyr	Thr	Pro	Met	Leu	Val	Ala	Gln	Arg	Leu	Leu	His	Glu	Gln	Asn		
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Phe	Asp	Glu	Ala	Asn	Arg	Trp	Leu	Lys	Tyr	Val	Trp	Ser	Pro	Ser		
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Arg	Pro	Leu	Leu	Glu	Asp	Thr	Ser	Trp	Asn	Ser	Asp	Pro	Leu	Asp		
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Ser	Val	Asp	Pro	Asp	Ala	Val	Ala	Gln	His	Asp	Pro	Met	His	Tyr		
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Lys	Val	Ser	Thr	Phe	Met	Arg	Thr	Leu	Asp	Leu	Leu	Ile	Ala	Arg		
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Gly	Asp	His	Ala	Tyr	Arg	Gln	Leu	Glu	Arg	Asp	Thr	Leu	Asn	Glu	
1865	1870	1875													
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Pro	Tyr	Leu	Pro	Leu	Ser	Thr	Thr	Trp	Ser	Asp	Pro	Arg	Leu	Asp	
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Arg	Ala	Ala	Asp	Ile	Thr	Thr	Gln	Asn	Ala	His	Asp	Ser	Ala	Ile	
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1940	1945	1950													
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1955	1960	1965													
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1970	1975	1980													
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Pro	Ile	Tyr	Ala	Thr	Pro	Ala	Asp	Pro	Lys	Ala	Leu	Leu	Ser	Ala	
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Ile	Glu	Arg	Gln	Asp	Ala	Glu	Ala	Leu	Asn	Ala	Leu	Leu	Gln	Asn	
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Gln	Ala	Ala	Glu	Leu	Ile	Leu	Thr	Asn	Leu	Ser	Ile	Gln	Asp	Lys	
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Thr	Ile	Glu	Glu	Leu	Asp	Ala	Glu	Lys	Thr	Val	Leu	Glu	Lys	Ser	
2075	2080	2085													
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Lys	Ala	Gly	Ala	Gln	Ser	Arg	Phe	Asp	Ser	Tyr	Gly	Lys	Leu	Tyr	
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Asp	Glu	Asn	Ile	Asn	Ala	Gly	Glu	Asn	Gln	Ala	Met	Thr	Leu	Arg	
	2105					2110					2115				
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Ala	Ser	Ala	Ala	Gly	Leu	Thr	Thr	Ala	Val	Gln	Ala	Ser	Arg	Leu	
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Ala	Gly	Ala	Ala	Ala	Asp	Leu	Val	Pro	Asn	Ile	Phe	Gly	Phe	Ala	
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Val	Met	Glu	Phe	Ser	Ala	Asn	Val	Met	Asn	Thr	Glu	Ala	Asp	Lys	
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Ile	Ser	Gln	Ser	Glu	Thr	Tyr	Arg	Arg	Arg	Arg	Gln	Glu	Trp	Glu	
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Ile	Gln	Arg	Asn	Asn	Ala	Glu	Ala	Glu	Leu	Lys	Gln	Ile	Asp	Ala	
	2195					2200					2205				
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Gln	Leu	Lys	Ser	Leu	Ala	Val	Arg	Arg	Glu	Ala	Ala	Val	Leu	Gln	
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Lys	Thr	Ser	Leu	Lys	Thr	Gln	Gln	Glu	Gln	Thr	Gln	Ser	Gln	Leu	
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Ala	Phe	Leu	Gln	Arg	Lys	Phe	Ser	Asn	Gln	Ala	Leu	Tyr	Asn	Trp	
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Leu	Arg	Gly	Arg	Leu	Ala	Ala	Ile	Tyr	Phe	Gln	Phe	Tyr	Asp	Leu	
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Ala	Val	Ser	His	Gly	Met	Asn	Asp	Ser	Gly	Gln	Phe	Gln	Leu	Asp	
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Phe	Asn	Asp	Gly	Lys	Phe	Leu	Pro	Phe	Glu	Gly	Ile	Ala	Ile	Asp	
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Gln	Gly	Thr	Leu	Thr	Leu	Ser	Phe	Pro	Asn	Ala	Ser	Met	Pro	Glu	
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Leu	His	Ile	Arg	Tyr	Thr	Ile	Lys								
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&lt;210&gt; 2

&lt;211&gt; 2516

&lt;212&gt; PRT

&lt;213&gt; Photorhabdus luminescens

&lt;400&gt; 2

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			20					25					30		
Arg	Gln	Gln	Val	Ser	Glu	His	Leu	Ser	Trp	Ser	Glu	Thr	His	Asp	Leu

35					40					45					
Tyr	His	Asp	Ala	Gln	Gln	Ala	Gln	Lys	Asp	Asn	Arg	Leu	Tyr	Glu	Ala
	50					55					60				
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Ala	Ile	Leu	Ala	Pro	Asn	Ala	Glu	Leu	Ile	Gly	Tyr	Asn	Asn	Gln	Phe
				85					90					95	
Ser	Gly	Arg	Ala	Ser	Gln	Tyr	Val	Ala	Pro	Gly	Thr	Val	Ser	Ser	Met
			100					105					110		
Phe	Ser	Pro	Ala	Ala	Tyr	Leu	Thr	Glu	Leu	Tyr	Arg	Glu	Ala	Arg	Asn
		115					120					125			
Leu	His	Ala	Ser	Asp	Ser	Val	Tyr	Tyr	Leu	Asp	Thr	Arg	Arg	Pro	Asp
	130					135					140				
Leu	Lys	Ser	Met	Ala	Leu	Ser	Gln	Gln	Asn	Met	Asp	Ile	Glu	Leu	Ser
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Thr	Leu	Ser	Leu	Ser	Asn	Glu	Leu	Leu	Leu	Glu	Ser	Ile	Lys	Thr	Glu
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Ser	Lys	Leu	Glu	Asn	Tyr	Thr	Lys	Val	Met	Glu	Met	Leu	Ser	Thr	Phe
			180					185					190		
Arg	Pro	Ser	Gly	Ala	Thr	Pro	Tyr	His	Asp	Ala	Tyr	Glu	Asn	Val	Arg
		195					200					205			
Glu	Val	Ile	Gln	Leu	Gln	Asp	Pro	Gly	Leu	Glu	Gln	Leu	Asn	Ala	Ser
	210					215					220				
Pro	Ala	Ile	Ala	Gly	Leu	Met	His	Gln	Ala	Ser	Leu	Leu	Gly	Ile	Asn
225					230					235					240
Ala	Ser	Ile	Ser	Pro	Glu	Leu	Phe	Asn	Ile	Leu	Thr	Glu	Glu	Ile	Thr
				245					250					255	
Glu	Gly	Asn	Ala	Glu	Glu	Leu	Tyr	Lys	Lys	Asn	Phe	Gly	Asn	Ile	Glu
			260					265					270		
Pro	Ala	Ser	Leu	Ala	Met	Pro	Glu	Tyr	Leu	Lys	Arg	Tyr	Tyr	Asn	Leu
		275					280					285			
Ser	Asp	Glu	Glu	Leu	Ser	Gln	Phe	Ile	Gly	Lys	Ala	Ser	Asn	Phe	Gly
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Gln	Gln	Glu	Tyr	Ser	Asn	Asn	Gln	Leu	Ile	Thr	Pro	Val	Val	Asn	Ser
305					310					315					320
Ser	Asp	Gly	Thr	Val	Lys	Val	Tyr	Arg	Ile	Thr	Arg	Glu	Tyr	Thr	Thr
				325					330					335	
Asn	Ala	Tyr	Gln	Met	Asp	Val	Glu	Leu	Phe	Pro	Phe	Gly	Gly	Glu	Asn
			340					345					350		
Tyr	Arg	Leu	Asp	Tyr	Lys	Phe	Lys	Asn	Phe	Tyr	Asn	Ala	Ser	Tyr	Leu
		355					360					365			
Ser	Ile	Lys	Leu	Asn	Asp	Lys	Arg	Glu	Leu	Val	Arg	Thr	Glu	Gly	Ala
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Pro	Gln	Val	Asn	Ile	Glu	Tyr	Ser	Ala	Asn	Ile	Thr	Leu	Asn	Thr	Ala	385	390	395	400
Asp	Ile	Ser	Gln	Pro	Phe	Glu	Ile	Gly	Leu	Thr	Arg	Val	Leu	Pro	Ser	405	410	415	
Gly	Ser	Trp	Ala	Tyr	Ala	Ala	Ala	Lys	Phe	Thr	Val	Glu	Glu	Tyr	Asn	420	425	430	
Gln	Tyr	Ser	Phe	Leu	Leu	Lys	Leu	Asn	Lys	Ala	Ile	Arg	Leu	Ser	Arg	435	440	445	
Ala	Thr	Glu	Leu	Ser	Pro	Thr	Ile	Leu	Glu	Gly	Ile	Val	Arg	Ser	Val	450	455	460	
Asn	Leu	Gln	Leu	Asp	Ile	Asn	Thr	Asp	Val	Leu	Gly	Lys	Val	Phe	Leu	465	470	475	480
Thr	Lys	Tyr	Tyr	Met	Gln	Arg	Tyr	Ala	Ile	His	Ala	Glu	Thr	Ala	Leu	485	490	495	
Ile	Leu	Cys	Asn	Ala	Pro	Ile	Ser	Gln	Arg	Ser	Tyr	Asp	Asn	Gln	Pro	500	505	510	
Ser	Gln	Phe	Asp	Arg	Leu	Phe	Asn	Thr	Pro	Leu	Leu	Asn	Gly	Gln	Tyr	515	520	525	
Phe	Ser	Thr	Gly	Asp	Glu	Glu	Ile	Asp	Leu	Asn	Ser	Gly	Ser	Thr	Gly	530	535	540	
Asp	Trp	Arg	Lys	Thr	Ile	Leu	Lys	Arg	Ala	Phe	Asn	Ile	Asp	Asp	Val	545	550	555	560
Ser	Leu	Phe	Arg	Leu	Leu	Lys	Ile	Thr	Asp	His	Asp	Asn	Lys	Asp	Gly	565	570	575	
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Leu	His	Thr	Gln	Lys	Trp	Ser	Val	Phe	Gln	Leu	Phe	Ile	Met	Thr	Ser	645	650	655	
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Thr	Val	Tyr	His	Gly	Leu	Gln	Gly	Phe	Asp	Lys	Asp	Lys	Ala	Asp	Leu	675	680	685	
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Val	Asn	Val	Ala	Gln	Gln	Leu	Asn	Val	Ala	Pro	Gln	Gly	Val	Ser	Ala	
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Thr	Asp	Ser	Lys	Gly	Thr	Ala	Thr	Asp	Val	Ser	Gly	Pro	Val	Glu
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Ile	Asn	Thr	Ala	Ile	Ser	Pro	Ala	Lys	Val	Gln	Ile	Ile	Val	Lys
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Ala	Leu	Glu	Ile	Asp	Gly	Ser	Gly	Leu	Asn	Phe	Ile	Asn	Asn	Ser
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Lys Val Lys Asp Lys Leu Ser Trp Ser Gln Thr Gln Ser Leu Tyr Leu	
35 40 45	

gaa gca cag cag gtg caa aag gat aac ctt ctg cat gaa gcc cgt att Glu Ala Gln Gln Val Gln Lys Asp Asn Leu Leu His Glu Ala Arg Ile 50 55 60	192
ctg aaa cgc gca aac cct cat tta caa agt gcg gtc cat ctt gcc ctg Leu Lys Arg Ala Asn Pro His Leu Gln Ser Ala Val His Leu Ala Leu 65 70 75 80	240
aca gca cct cat gca gac cag caa ggt tat aat agc cga ttt ggc aat Thr Ala Pro His Ala Asp Gln Gln Gly Tyr Asn Ser Arg Phe Gly Asn 85 90 95	288
cgc gcc agc aaa tat gca gcc cct ggc gca att tcc tcc atg ttt tct Arg Ala Ser Lys Tyr Ala Ala Pro Gly Ala Ile Ser Ser Met Phe Ser 100 105 110	336
ctt gcg gct tat ctg act gaa ctt tat cgt cag gca cga aat tta cat Leu Ala Ala Tyr Leu Thr Glu Leu Tyr Arg Gln Ala Arg Asn Leu His 115 120 125	384
gca gaa ggt tcc att tat cat ctg gat acg cgt cgc cca gat cta aaa Ala Glu Gly Ser Ile Tyr His Leu Asp Thr Arg Arg Pro Asp Leu Lys 130 135 140	432
tca ttg gtg ctc agc cag aaa aat atg aat acg gag att tcc acg ctt Ser Leu Val Leu Ser Gln Lys Asn Met Asn Thr Glu Ile Ser Thr Leu 145 150 155 160	480
tct ctg tct aat aac atg ttg cta aac agt att aag act cag cct aat Ser Leu Ser Asn Asn Met Leu Leu Asn Ser Ile Lys Thr Gln Pro Asn 165 170 175	528
ctg aac agc cac gct aaa gtg atg gaa aag tta tca act ttc cgc act Leu Asn Ser His Ala Lys Val Met Glu Lys Leu Ser Thr Phe Arg Thr 180 185 190	576
tct ggc tca atg cca tat cac gat gct tat gaa agt gta cgt aag att Ser Gly Ser Met Pro Tyr His Asp Ala Tyr Glu Ser Val Arg Lys Ile 195 200 205	624
att caa tta caa gct cct gtg ttt gaa caa tcc agt aca tta aca gat Ile Gln Leu Gln Ala Pro Val Phe Glu Gln Ser Ser Thr Leu Thr Asp 210 215 220	672
acg cca atc acc aaa ctg atg tat caa atc tcc ttg ctg ggg att aat Thr Pro Ile Thr Lys Leu Met Tyr Gln Ile Ser Leu Leu Gly Ile Asn 225 230 235 240	720
gcc tct gtc tca ccg gag ctg ttt act att ctg acg caa aag ata aaa Ala Ser Val Ser Pro Glu Leu Phe Thr Ile Leu Thr Gln Lys Ile Lys 245 250 255	768
cca gca acc aat gct gat aac act aat gaa cta aaa aaa ctt tat aag Pro Ala Thr Asn Ala Asp Asn Thr Asn Glu Leu Lys Lys Leu Tyr Lys 260 265 270	816
aag aat ttt ggt gaa att aaa tct att caa atg gca agg gca gaa tac Lys Asn Phe Gly Glu Ile Lys Ser Ile Gln Met Ala Arg Ala Glu Tyr 275 280 285	864
ctg aaa agt tat tat aat ctg aca gac aaa gaa ctt aac cag ttt agt Leu Lys Ser Tyr Tyr Asn Leu Thr Asp Lys Glu Leu Asn Gln Phe Ser 290 295 300	912

aaa aag att aaa caa ata gat agc ctg tgg aat ata gga gac gag att Lys Lys Ile Lys Gln Ile Asp Ser Leu Trp Asn Ile Gly Asp Glu Ile 305 310 315 320	960
acc caa tac cat cta ttg aaa ttc aat aaa gct att aat cta tct cga Thr Gln Tyr His Leu Leu Lys Phe Asn Lys Ala Ile Asn Leu Ser Arg 325 330 335	1008
tca acc gag cta tca cca ata atc ctt aac agc att gcc atc gat atc Ser Thr Glu Leu Ser Pro Ile Ile Leu Asn Ser Ile Ala Ile Asp Ile 340 345 350	1056
ctt aaa aaa aca cct cca gag gat gac tct gac aac cct ttt agg gac Leu Lys Lys Thr Pro Pro Glu Asp Asp Ser Asp Asn Pro Phe Arg Asp 355 360 365	1104
gac cct gat tac ctt gaa agc ttt caa gac ctt gac ctt agt gac gaa Asp Pro Asp Tyr Leu Glu Ser Phe Gln Asp Leu Asp Leu Ser Asp Glu 370 375 380	1152
cca gat ata gac gaa gat gta tta aga gaa gct tta cgt gtt aaa gac Pro Asp Ile Asp Glu Asp Val Leu Arg Glu Ala Leu Arg Val Lys Asp 385 390 395 400	1200
tat atg caa cgt tat ggt att gat gct gag act gca tta ata ctg tgc Tyr Met Gln Arg Tyr Gly Ile Asp Ala Glu Thr Ala Leu Ile Leu Cys 405 410 415	1248
aaa gca ccc att tca gaa aat cct tct cat ccc gat cta tcc aaa tta Lys Ala Pro Ile Ser Glu Asn Pro Ser His Pro Asp Leu Ser Lys Leu 420 425 430	1296
cta gca gac atc cat caa tta act att gat gaa tta ggg gta cta ctg Leu Ala Asp Ile His Gln Leu Thr Ile Asp Glu Leu Gly Val Leu Leu 435 440 445	1344
gtt gcc ata gat gaa gga aaa acc gat tta tct cag att act cat gac Val Ala Ile Asp Glu Gly Lys Thr Asp Leu Ser Gln Ile Thr His Asp 450 455 460	1392
aat tta gcg gtt cta att agc aaa ctc tat tcc gtt acc aat tgg ctg Asn Leu Ala Val Leu Ile Ser Lys Leu Tyr Ser Val Thr Asn Trp Leu 465 470 475 480	1440
cgt aca cgg aaa tgg agt gta tat cag tta ttt gta atg acg acc gat Arg Thr Arg Lys Trp Ser Val Tyr Gln Leu Phe Val Met Thr Thr Asp 485 490 495	1488
aaa tat aac aaa acc tta acc ccg gaa ata aac aac ctt ctg gat acc Lys Tyr Asn Lys Thr Leu Thr Pro Glu Ile Asn Asn Leu Leu Asp Thr 500 505 510	1536
gtc tac aat ggc ttg cag aac ttt tac aag gat aat ttg cta aaa ata Val Tyr Asn Gly Leu Gln Asn Phe Tyr Lys Asp Asn Leu Leu Lys Ile 515 520 525	1584
aaa gat aat cta ttg aaa gcc aaa gaa agt tta cca gaa gac aaa gat Lys Asp Asn Leu Leu Lys Ala Lys Glu Ser Leu Pro Glu Asp Lys Asp 530 535 540	1632
aat ttg ccg aaa gcc gag caa tat ctg ttg gaa gcc gag aaa tat ctg Asn Leu Pro Lys Ala Glu Gln Tyr Leu Leu Glu Ala Glu Lys Tyr Leu 545 550 555 560	1680

cta gca gcc gag aaa tat ctg cta gca gcc gag aaa tat cta ttg gaa Leu Ala Ala Glu Lys Tyr Leu Leu Ala Ala Glu Lys Tyr Leu Leu Glu 565 570 575	1728
gcc aat aaa aat ccg cta gaa gcc aaa aag gct ctg aaa gaa tac gag Ala Asn Lys Asn Pro Leu Glu Ala Lys Lys Ala Leu Lys Glu Tyr Glu 580 585 590	1776
aaa aat cag gag gca tac gag aaa aat ctg aaa gaa cac gag aaa tat Lys Asn Gln Glu Ala Tyr Glu Lys Asn Leu Lys Glu His Glu Lys Tyr 595 600 605	1824
ctg ttg aaa gcc gga gaa aat ctg cca gca atc aaa gag aat ttg cta Leu Leu Lys Ala Gly Glu Asn Leu Pro Ala Ile Lys Glu Asn Leu Leu 610 615 620	1872
aaa atc aag gaa aat ctg cca aaa gcc ata tct cct tat atc gcc gcc Lys Ile Lys Glu Asn Leu Pro Lys Ala Ile Ser Pro Tyr Ile Ala Ala 625 630 635 640	1920
gct ctg caa ttg cca tct gag aat gtt gct ctc tcc gtg ctg gct tgg Ala Leu Gln Leu Pro Ser Glu Asn Val Ala Leu Ser Val Leu Ala Trp 645 650 655	1968
gca gat aaa cta aac tct ggc aaa gaa aac aaa atg acg gca gat tca Ala Asp Lys Leu Asn Ser Gly Lys Glu Asn Lys Met Thr Ala Asp Ser 660 665 670	2016
ttc tgg aac tgg tta cgg aaa aaa ccc att gaa act caa tcg aaa aca Phe Trp Asn Trp Leu Arg Lys Lys Pro Ile Glu Thr Gln Ser Lys Thr 675 680 685	2064
act gaa gca act gaa gca act gaa gca act gaa gca act gaa gca act Thr Glu Ala Thr Glu Ala Thr Glu Ala Thr Glu Ala Thr Glu Ala Thr 690 695 700	2112
gaa gca act gaa aaa act aca cta att caa caa gct gtc caa tat tgc Glu Ala Thr Glu Lys Thr Thr Leu Ile Gln Gln Ala Val Gln Tyr Cys 705 710 715 720	2160
cag tgc cta gca caa ctg gcg ctg att tat cgc tct acc ggt ctt agc Gln Cys Leu Ala Gln Leu Ala Leu Ile Tyr Arg Ser Thr Gly Leu Ser 725 730 735	2208
gaa agc act tta cgt ctg ttt gtg aca aat cca caa atc ttt ggt ctt Glu Ser Thr Leu Arg Leu Phe Val Thr Asn Pro Gln Ile Phe Gly Leu 740 745 750	2256
acc gcg aaa aca acg tca aca cac aat gta tta tca ctg att atg ctg Thr Ala Lys Thr Thr Ser Thr His Asn Val Leu Ser Leu Ile Met Leu 755 760 765	2304
acg cgt ttt act gac tgg gtt aac tca cta ggt gaa aac gcc tct tct Thr Arg Phe Thr Asp Trp Val Asn Ser Leu Gly Glu Asn Ala Ser Ser 770 775 780	2352
gta ctg acc gag ttt gaa aaa gga aca tta acg gca gaa cta ttg gct Val Leu Thr Glu Phe Glu Lys Gly Thr Leu Thr Ala Glu Leu Leu Ala 785 790 795 800	2400
aac gcc atg aat ctt gat aaa aat cta cta gag caa gcc agt act caa Asn Ala Met Asn Leu Asp Lys Asn Leu Leu Glu Gln Ala Ser Thr Gln 805 810 815	2448

gca caa gct gat ttc tcc aat tgg cca tct atc gac aac cta ttg cag Ala Gln Ala Asp Phe Ser Asn Trp Pro Ser Ile Asp Asn Leu Leu Gln 820 825 830	2496
tgg att aac atc tgc cgt caa ttg aac atc tgc cca caa ggc gtt tct Trp Ile Asn Ile Ser Arg Gln Leu Asn Ile Ser Pro Gln Gly Val Ser 835 840 845	2544
gaa ctg gcg aaa ata tta gac ata gaa tct tct act aat tat gcc caa Glu Leu Ala Lys Ile Leu Asp Ile Glu Ser Ser Thr Asn Tyr Ala Gln 850 855 860	2592
tgg gaa aat gtc gct tca ata tta acc gcc gga cta gat acc caa aaa Trp Glu Asn Val Ala Ser Ile Leu Thr Ala Gly Leu Asp Thr Gln Lys 865 870 875 880	2640
gcc aat acc cta cat gca ttt ctg ggt gag tct cgc agt act gcg tta Ala Asn Thr Leu His Ala Phe Leu Gly Glu Ser Arg Ser Thr Ala Leu 885 890 895	2688
agt aca tac tat att tat tct cat aac caa aaa gat cga gaa gaa aga Ser Thr Tyr Tyr Ile Tyr Ser His Asn Gln Lys Asp Arg Glu Glu Arg 900 905 910	2736
aaa cat acg gta att aaa gac cgt gat gat cta tat caa tac ctg ttg Lys His Thr Val Ile Lys Asp Arg Asp Asp Leu Tyr Gln Tyr Leu Leu 915 920 925	2784
atc gat aac caa gtc tcc gcc gcc atc aaa acc acg gag att gct gaa Ile Asp Asn Gln Val Ser Ala Ala Ile Lys Thr Thr Glu Ile Ala Glu 930 935 940	2832
gct atc gct agt atc caa ctg tat att aac cgc gca ttg aaa aat atg Ala Ile Ala Ser Ile Gln Leu Tyr Ile Asn Arg Ala Leu Lys Asn Met 945 950 955 960	2880
gag gga gat acc gac aca agt gtc act agc cgt tta ttc ttc act aac Glu Gly Asp Thr Asp Thr Ser Val Thr Ser Arg Leu Phe Phe Thr Asn 965 970 975	2928
tgg gat aaa tac aac aaa cgc tac agc acc tgg gct ggt att act aag Trp Asp Lys Tyr Asn Lys Arg Tyr Ser Thr Trp Ala Gly Ile Thr Lys 980 985 990	2976
ctc ctt tac tac cct gaa aac tat atc gat ccg aca ctg cgg atc ggc Leu Leu Tyr Tyr Pro Glu Asn Tyr Ile Asp Pro Thr Leu Arg Ile Gly 995 1000 1005	3024
cag aca aaa atg atg gat acg cta ctg caa tcc atc agc caa agt Gln Thr Lys Met Met Asp Thr Leu Leu Gln Ser Ile Ser Gln Ser 1010 1015 1020	3069
caa ttg aat acc gat acc gta gaa gat gcc ttt aaa tct tat cta Gln Leu Asn Thr Asp Thr Val Glu Asp Ala Phe Lys Ser Tyr Leu 1025 1030 1035	3114
acg tca ttc gaa caa gtg gct aat ctg gaa gtc atc agc gcc tat Thr Ser Phe Glu Gln Val Ala Asn Leu Glu Val Ile Ser Ala Tyr 1040 1045 1050	3159
cat gac aat att aat aat gac caa gga ttg acc tat ttt atc gga His Asp Asn Ile Asn Asn Asp Gln Gly Leu Thr Tyr Phe Ile Gly 1055 1060 1065	3204

cgc agt aaa aca gaa gtg aat caa tat tat tgg cgc agt gta gat Arg Ser Lys Thr Glu Val Asn Gln Tyr Tyr Trp Arg Ser Val Asp 1070 1075 1080	3249
cac aat aaa ttc agc gaa ggt aaa ttc ccc gct aat gcc tgg agc His Asn Lys Phe Ser Glu Gly Lys Phe Pro Ala Asn Ala Trp Ser 1085 1090 1095	3294
gag tgg cac aaa att gac tgc cca att aat ccc tac gaa gat act Glu Trp His Lys Ile Asp Cys Pro Ile Asn Pro Tyr Glu Asp Thr 1100 1105 1110	3339
atc cgc ccg gta gtc tac caa tcc cgc ctg tat att atc tgg ctg Ile Arg Pro Val Val Tyr Gln Ser Arg Leu Tyr Ile Ile Trp Leu 1115 1120 1125	3384
gaa cag aag aag gta act aat cga gca gaa gga gaa gct atc aaa Glu Gln Lys Lys Val Thr Asn Arg Ala Glu Gly Glu Ala Ile Lys 1130 1135 1140	3429
caa gga agc aaa acg acc aca agc tat cat tat gaa ctg aaa ttg Gln Gly Ser Lys Thr Thr Thr Ser Tyr His Tyr Glu Leu Lys Leu 1145 1150 1155	3474
gca cat att cgt tat gac ggc acc tgg aat aca cca att acc ttt Ala His Ile Arg Tyr Asp Gly Thr Trp Asn Thr Pro Ile Thr Phe 1160 1165 1170	3519
gat gta gat gaa aaa ata tct ggt cta aat tta gaa ctg aat aaa Asp Val Asp Glu Lys Ile Ser Gly Leu Asn Leu Glu Leu Asn Lys 1175 1180 1185	3564
gcg tta ggg ctc tat tgt gca agt tat caa ggc aaa gat aaa ttg Ala Leu Gly Leu Tyr Cys Ala Ser Tyr Gln Gly Lys Asp Lys Leu 1190 1195 1200	3609
ctg gtt atg ttt tat aaa aaa cag gag caa tta aat aat tac aca Leu Val Met Phe Tyr Lys Lys Gln Glu Gln Leu Asn Asn Tyr Thr 1205 1210 1215	3654
gaa aaa aca gga aac aca tac aca gca cca ata aaa ggg cta tat Glu Lys Thr Gly Asn Thr Tyr Thr Ala Pro Ile Lys Gly Leu Tyr 1220 1225 1230	3699
atc act tcc aat atg tct cct gag gaa atg aca ccc gaa agt tac Ile Thr Ser Asn Met Ser Pro Glu Glu Met Thr Pro Glu Ser Tyr 1235 1240 1245	3744
aga ctt aat gct cat aaa cag ttt gat acc aac aat gtc gta aga Arg Leu Asn Ala His Lys Gln Phe Asp Thr Asn Asn Val Val Arg 1250 1255 1260	3789
gtc aat aac cgc tat gca gaa agc tac gaa atc cct tca tca gta Val Asn Asn Arg Tyr Ala Glu Ser Tyr Glu Ile Pro Ser Ser Val 1265 1270 1275	3834
aac agt aat aat ggt tat gat tgg gga gag ggc tat ctg agt atg Asn Ser Asn Asn Gly Tyr Asp Trp Gly Glu Gly Tyr Leu Ser Met 1280 1285 1290	3879
gta tac ggc ggg agc att ctg att acc cgt gac cca agc gat aac Val Tyr Gly Gly Ser Ile Leu Ile Thr Arg Asp Pro Ser Asp Asn 1295 1300 1305	3924



tca Ser 1310	aaa Lys 1310	atc Ile	caa Gln	atc Ile	tca Ser	cca Pro 1315	aag Lys	tta Leu	aga Arg	att Ile	att Ile 1320	cat His	aat Asn	gga Gly	3969
tat Tyr 1325	gaa Glu 1325	ggg Gly	cga Arg	caa Gln	cgt Arg	aat Asn 1330	caa Gln	tgc Cys	aat Asn	ttg Leu	atg Met 1335	aag Lys	aaa Lys	tac Tyr	4014
ggc Gly 1340	aag Lys 1340	ctc Leu	ggg Gly	gat Asp	aaa Lys	ttc Phe 1345	att Ile	att Ile	tat Tyr	act Thr	acg Thr 1350	cta Leu	ggg Gly	att Ile	4059
aac Asn 1355	ccc Pro 1355	aat Asn	aat Asn	tta Leu	tca Ser	aat Asn 1360	aaa Lys	aaa Lys	ctt Leu	atc Ile	tac Tyr 1365	cct Pro	gtt Val	tat Tyr	4104
caa Gln 1370	tat Tyr 1370	gaa Glu	gga Gly	aat Asn	gaa Glu	agt Ser 1375	aag Lys	ctt Leu	agt Ser	caa Gln	gga Gly 1380	aga Arg	ctt Leu	ctg Leu	4149
ttt Phe 1385	tat Tyr 1385	cgg Arg	gat Asp	agc Ser	acc Thr	act Thr 1390	aac Asn	ttt Phe	aca Thr	aga Arg	gcc Ala 1395	tgg Trp	ttc Phe	cct Pro	4194
aac Asn 1400	ctt Leu 1400	tct Ser	tct Ser	gac Asp	tca Ser	aaa Lys 1405	gaa Glu	atg Met	tcc Ser	ata Ile	acc Thr 1410	act Thr	ggc Gly	ggg Gly	4239
aac Asn 1415	att Ile 1415	agt Ser	ggg Gly	aat Asn	tat Tyr	ggg Gly 1420	tat Tyr	att Ile	gat Asp	aac Asn	aaa Lys 1425	cat His	agt Ser	gac Asp	4284
aac Asn 1430	aaa Lys 1430	cca Pro	ttc Phe	gaa Glu	gaa Glu	tat Tyr 1435	ttc Phe	tat Tyr	atg Met	gac Asp	gac Asp 1440	cac His	ggc Gly	ggg Gly	4329
att Ile 1445	gac Asp 1445	act Thr	gac Asp	gtt Val	tcg Ser	gag Glu 1450	cca Pro	ata Ile	ttt Phe	att Ile	aat Asn 1455	aca Thr	aaa Lys	att Ile	4374
cag Gln 1460	cct Pro 1460	tca Ser	aat Asn	gtt Val	aaa Lys	atc Ile 1465	ata Ile	gtg Val	aaa Lys	aca Thr	gtg Val 1470	aag Lys	gat Asp	gat Asp	4419
gga Gly 1475	aaa Lys 1475	tta Leu	gac Asp	agt Ser	aaa Lys	cca Pro 1480	tat Tyr	ata Ile	gca Ala	gaa Glu	gac Asp 1485	aaa Lys	gtt Val	tca Ser	4464
gtt Val 1490	aaa Lys 1490	ccg Pro	aca Thr	cca Pro	aac Asn	ttt Phe 1495	gaa Glu	gaa Glu	atg Met	tgt Cys	tat Tyr 1500	cag Gln	ttt Phe	aat Asn	4509
aat Asn 1505	ctc Leu 1505	gat Asp	caa Gln	ata Ile	gat Asp	gtc Val 1510	tcc Ser	act Thr	cta Leu	gta Val	ttt Phe 1515	aaa Lys	aat Asn	aat Asn	4554
gaa Glu 1520	gca Ala 1520	agt Ser	att Ile	gat Asp	atc Ile	acc Thr 1525	ttt Phe	aca Thr	gca Ala	tct Ser	gct Ala 1530	gac Asp	gca Ala	ttt Phe	4599
gaa Glu 1535	agt Ser 1535	ggg Gly	aaa Lys	gaa Glu	caa Gln	cgt Arg 1540	aat Asn	cta Leu	ggg Gly	gaa Glu	gaa Glu 1545	cat His	ttc Phe	agt Ser	4644

att Ile 1550	cgt Arg	att Ile	atc Ile	aaa Lys	aaa Lys	gcg Ala 1555	aat Asn	gtt Val	aat Asn	gat Asp	gtc Val 1560	ctg Leu	acc Thr	ctt Leu	4689
cac His 1565	cac His	gat Asp	cca Pro	agt Ser	ggg Gly	gca Ala 1570	caa Gln	tat Tyr	atg Met	caa Gln	tgg Trp 1575	gga Gly	gcc Ala	tat Tyr	4734
cgt Arg 1580	act Thr	cgc Arg	ctt Leu	aat Asn	acc Thr	ctg Leu 1585	ttt Phe	gcc Ala	cgt Arg	aaa Lys	tta Leu 1590	att Ile	agc Ser	cgc Arg	4779
gcc Ala 1595	aat Asn	gcg Ala	ggg Gly	atc Ile	gac Asp	act Thr 1600	att Ile	ttg Leu	agt Ser	atg Met	gaa Glu 1605	act Thr	cag Gln	aat Asn	4824
att Ile 1610	caa Gln	gag Glu	cca Pro	caa Gln	tta Leu	ggc Gly 1615	aaa Lys	ggc Gly	ttt Phe	tat Tyr	gtt Val 1620	aat Asn	ttc Phe	act Thr	4869
ctt Leu 1625	cct Pro	aaa Lys	tat Tyr	gat Asp	caa Gln	aac Asn 1630	aca Thr	cat His	ggg Gly	aat Asn	gaa Glu 1635	cgc Arg	cag Gln	ttt Phe	4914
aaa Lys 1640	att Ile	cat His	ata Ile	ggg Gly	aat Asn	att Ile 1645	gct Ala	ggg Gly	gat Asp	aat Asn	aca Thr 1650	atg Met	cgg Arg	cca Pro	4959
tat Tyr 1655	tac Tyr	caa Gln	gga Gly	ata Ile	ttg Leu	gct Ala 1660	gac Asp	acc Thr	gaa Glu	acc Thr	agt Ser 1665	gtc Val	gtt Val	ctt Leu	5004
ttt Phe 1670	gtc Val	cct Pro	tat Tyr	gag Glu	aaa Lys	caa Gln 1675	tct Ser	tat Tyr	acc Thr	aat Asn	gaa Glu 1680	ggg Gly	gtt Val	aga Arg	5049
tta Leu 1685	gga Gly	gtt Val	gaa Glu	tac Tyr	aaa Lys	aaa Lys 1690	gta Val	tct Ser	tac Tyr	cta Leu	ggc Gly 1695	gtc Val	tgg Trp	gaa Glu	5094
ccc Pro 1700	gct Ala	ttc Phe	ttc Phe	tat Tyr	ttc Phe	aat Asn 1705	gaa Glu	att Ile	caa Gln	cag Gln	aag Lys 1710	ttt Phe	att Ile	ctg Leu	5139
att Ile 1715	aat Asn	gat Asp	gcc Ala	gat Asp	cat His	aac Asn 1720	tca Ser	gca Ala	atg Met	act Thr	caa Gln 1725	tct Ser	ggg Gly	gaa Glu	5184
aaa Lys 1730	aca Thr	gga Gly	att Ile	aaa Lys	aaa Lys	tac Tyr 1735	aaa Lys	ggc Gly	ttt Phe	ctt Leu	gac Asp 1740	gtt Val	tct Ser	att Ile	5229
ctt Leu 1745	atc Ile	gat Asp	cat His	cag Gln	cac His	aca Thr 1750	gaa Glu	cca Pro	atg Met	gac Asp	ttc Phe 1755	aac Asn	ggc Gly	gcc Ala	5274
aac Asn 1760	agc Ser	ctc Leu	tac Tyr	ttc Phe	tgg Trp	gaa Glu 1765	ctg Leu	ttc Phe	tac Tyr	tat Tyr	acc Thr 1770	ccg Pro	atg Met	ctg Leu	5319
atc Ile 1775	gct Ala	caa Gln	cgt Arg	ttg Leu	cta Leu	cac His 1780	gag Glu	caa Gln	aat Asn	ttc Phe	gat Asp 1785	gaa Glu	gct Ala	aac Asn	5364

cgt Arg 1790	tgg Trp	ctg Leu	aaa Lys	tat Tyr	gtc Val	tgg Trp 1795	aat Asn	cca Pro	tct Ser	ggt Gly	cat His 1800	att Ile	gcc Ala	aat Asn	5409
ggt Gly 1805	caa Gln	aaa Lys	cag Gln	cac His	ccc Pro	cac His 1810	aac Asn	tgg Trp	aat Asn	gtc Val	cgc Arg 1815	cca Pro	tta Leu	caa Gln	5454
gag Glu 1820	gac Asp	acc Thr	agt Ser	tgg Trp	aac Asn	gat Asp 1825	gat Asp	cca Pro	ttg Leu	gat Asp	aca Thr 1830	ttt Phe	gat Asp	ccc Pro	5499
gat Asp 1835	gcc Ala	atc Ile	gct Ala	caa Gln	cat His	gat Asp 1840	ccg Pro	atg Met	cac His	tac Tyr	aaa Lys 1845	gtc Val	gcc Ala	acc Thr	5544
ttt Phe 1850	atg Met	tgc Cys	gcc Ala	ctt Leu	gat Asp	cta Leu 1855	ttg Leu	atc Ile	gaa Glu	cag Gln	gga Gly 1860	gat Asp	tac Tyr	gcc Ala	5589
tat Tyr 1865	cgc Arg	cag Gln	ttg Leu	gaa Glu	cgg Arg	gac Asp 1870	aca Thr	ctc Leu	gcc Ala	gaa Glu	gcc Ala 1875	aaa Lys	atg Met	tgg Trp	5634
tat Tyr 1880	atg Met	cag Gln	gca Ala	ctg Leu	cat His	cta Leu 1885	tta Leu	ggc Gly	gat Asp	aaa Lys	cct Pro 1890	cat His	tta Leu	tta Leu	5679
ctc Leu 1895	agt Ser	tca Ser	aca Thr	tgg Trp	agt Ser	gat Asp 1900	cca Pro	gag Glu	cta Leu	aaa Lys	gaa Glu 1905	gcc Ala	gca Ala	gat Asp	5724
ctt Leu 1910	gaa Glu	aaa Lys	caa Gln	cag Gln	gca Ala	cat His 1915	gcc Ala	aaa Lys	gca Ala	ata Ile	gca Ala 1920	gat Asp	tta Leu	cga Arg	5769
caa Gln 1925	ggc Gly	cag Gln	cct Pro	aaa Lys	gat Asp	gga Gly 1930	agc Ser	aac Asn	aca Thr	gat Asp	ctt Leu 1935	ttc Phe	ctg Leu	cca Pro	5814
cag Gln 1940	gtc Val	aac Asn	gaa Glu	gtg Val	atg Met	ttg Leu 1945	agc Ser	tat Tyr	tgg Trp	cag Gln	aaa Lys 1950	ctg Leu	gaa Glu	caa Gln	5859
cgg Arg 1955	tta Leu	tat Tyr	aac Asn	ctg Leu	cgc Arg	cat His 1960	aac Asn	ctc Leu	tct Ser	att Ile	gat Asp 1965	ggt Gly	caa Gln	cct Pro	5904
tta Leu 1970	cat His	ttg Leu	cct Pro	att Ile	ttc Phe	gcg Ala 1975	aca Thr	ccg Pro	gca Ala	gat Asp	cca Pro 1980	aaa Lys	gcg Ala	ctg Leu	5949
ctc Leu 1985	agc Ser	gcc Ala	gct Ala	gtc Val	gcc Ala	agt Ser 1990	tca Ser	caa Gln	ggt Gly	gga Gly	agc Ser 1995	aat Asn	ctt Leu	ccg Pro	5994
tca Ser 2000	gag Glu	ttt Phe	ata Ile	tca Ser	gtt Val	tgg Trp 2005	cgt Arg	ttc Phe	cca Pro	cat His	atg Met 2010	ctg Leu	gaa Glu	aac Asn	6039
gcc Ala 2015	cgc Arg	agt Ser	atg Met	gtc Val	agt Ser	caa Gln 2020	ctc Leu	acc Thr	caa Gln	ttc Phe	ggc Gly 2025	tcc Ser	aca Thr	tta Leu	6084

caa Gln 2030	aat Asn	att Ile	atc Ile	gaa Glu	cgt Arg	cag Gln 2035	gat Asp	gcg Ala	gaa Glu	gca Ala	tta Leu 2040	aac Asn	acg Thr	ctg Leu	6129
tta Leu 2045	cag Gln	aat Asn	caa Gln	gcg Ala	gcg Ala	gaa Glu 2050	ctg Leu	ata Ile	ttg Leu	acc Thr	aat Asn 2055	ctc Leu	agc Ser	ata Ile	6174
cag Gln 2060	gac Asp	aaa Lys	acc Thr	att Ile	gaa Glu	gag Glu 2065	ctg Leu	gat Asp	gtt Val	gaa Glu	aaa Lys 2070	act Thr	gtg Val	cta Leu	6219
gaa Glu 2075	aaa Lys	acc Thr	cgc Arg	gcc Ala	gga Gly	gct Ala 2080	aaa Lys	tcg Ser	cgt Arg	ttt Phe	gat Asp 2085	agc Ser	tac Tyr	agc Ser	6264
aaa Lys 2090	ttc Phe	tac Tyr	gat Asp	gaa Glu	gat Asp	atc Ile 2095	aac Asn	gca Ala	ggg Gly	gaa Glu	aaa Lys 2100	cag Gln	gcg Ala	atg Met	6309
gcg Ala 2105	ttg Leu	cga Arg	gcc Ala	tcc Ser	gtc Val	gca Ala 2110	ggc Gly	atc Ile	tct Ser	act Thr	gca Ala 2115	ctt Leu	caa Gln	gca Ala	6354
tca Ser 2120	cat His	ctg Leu	gca Ala	ggc Gly	gca Ala	gcg Ala 2125	ctt Leu	gat Asp	ttg Leu	gct Ala	ccc Pro 2130	aac Asn	atc Ile	ttt Phe	6399
ggc Gly 2135	ttc Phe	gct Ala	gat Asp	ggc Gly	ggt Gly	agc Ser 2140	cat His	tgg Trp	gga Gly	gca Ala	att Ile 2145	gcc Ala	caa Gln	gcc Ala	6444
aca Thr 2150	agt Ser	aat Asn	gtc Val	atg Met	gaa Glu	ttc Phe 2155	tcc Ser	gcc Ala	agt Ser	gtc Val	atg Met 2160	agc Ser	acc Thr	gaa Glu	6489
gcg Ala 2165	gat Asp	aaa Lys	atc Ile	agc Ser	cag Gln	tct Ser 2170	gaa Glu	gcc Ala	tac Tyr	cgt Arg	cgg Arg 2175	cgt Arg	cga Arg	cag Gln	6534
gag Glu 2180	tgg Trp	aaa Lys	atc Ile	cag Gln	cgt Arg	aac Asn 2185	aac Asn	gct Ala	gat Asp	gca Ala	gag Glu 2190	ttg Leu	aaa Lys	caa Gln	6579
atc Ile 2195	gat Asp	gct Ala	caa Gln	ctt Leu	caa Gln	tca Ser 2200	tta Leu	gtc Val	gta Val	cgc Arg	cgt Arg 2205	gaa Glu	gcc Ala	gcc Ala	6624
gtg Val 2210	ttg Leu	cag Gln	aaa Lys	acc Thr	agc Ser	ctg Leu 2215	aaa Lys	acc Thr	caa Gln	caa Gln	gag Glu 2220	cag Gln	acg Thr	cac His	6669
gca Ala 2225	caa Gln	ctg Leu	acc Thr	ttc Phe	ctg Leu	caa Gln 2230	cat His	aag Lys	ttc Phe	agc Ser	aat Asn 2235	cag Gln	gca Ala	tta Leu	6714
tac Tyr 2240	aac Asn	tgg Trp	ctg Leu	cgt Arg	ggt Gly	cgg Arg 2245	ctg Leu	tcc Ser	gcc Ala	att Ile	tac Tyr 2250	ttc Phe	cag Gln	ttc Phe	6759
tat Tyr 2255	gat Asp	tta Leu	gcg Ala	gta Val	gcc Ala	cgt Arg 2260	tgc Cys	ctg Leu	atg Met	gct Ala	gaa Glu 2265	atg Met	gcc Ala	tat Tyr	6804

cgt tgg gag act aac gat gcc gca gca cgc ttt atc aag ccc ggc	6849
Arg Trp Glu Thr Asn Asp Ala Ala Ala Arg Phe Ile Lys Pro Gly	
2270 2275 2280	
gcc tgg cag gga acc cat gcc ggt ctg ctg gcg ggt gaa acc tta	6894
Ala Trp Gln Gly Thr His Ala Gly Leu Leu Ala Gly Glu Thr Leu	
2285 2290 2295	
atg ctg aat cta gca cag atg gaa gat gcc cac ctg aaa cag gag	6939
Met Leu Asn Leu Ala Gln Met Glu Asp Ala His Leu Lys Gln Glu	
2300 2305 2310	
caa cgc gta ctg gag gta gaa cgt acc gtt tca cta gca gaa gtt	6984
Gln Arg Val Leu Glu Val Glu Arg Thr Val Ser Leu Ala Glu Val	
2315 2320 2325	
tat aaa gag aaa ggt caa ttt tct ctg acc aag aaa att gca gaa	7029
Tyr Lys Glu Lys Gly Gln Phe Ser Leu Thr Lys Lys Ile Ala Glu	
2330 2335 2340	
ctg gtg aat aag aaa cca gac act acc agt agc aga aat aac aca	7074
Leu Val Asn Lys Lys Pro Asp Thr Thr Ser Ser Arg Asn Asn Thr	
2345 2350 2355	
ctg aat ttt ggt gaa gga aat gcc aaa act tct cta caa gcg tct	7119
Leu Asn Phe Gly Glu Gly Asn Ala Lys Thr Ser Leu Gln Ala Ser	
2360 2365 2370	
att tcg tta gct gac tta caa att cgt cac gat tac cca gaa aac	7164
Ile Ser Leu Ala Asp Leu Gln Ile Arg His Asp Tyr Pro Glu Asn	
2375 2380 2385	
agt gga gcc ggt aac gtc cgc cgg att aaa cag atc agt gtc acc	7209
Ser Gly Ala Gly Asn Val Arg Arg Ile Lys Gln Ile Ser Val Thr	
2390 2395 2400	
ctg ccg gca ctg tta gga cct tat cag gat gtg caa gcg att ctg	7254
Leu Pro Ala Leu Leu Gly Pro Tyr Gln Asp Val Gln Ala Ile Leu	
2405 2410 2415	
tct tat ggc gga gat gcc acc ggg tta gcc aaa ggt tgt aaa gcg	7299
Ser Tyr Gly Gly Asp Ala Thr Gly Leu Ala Lys Gly Cys Lys Ala	
2420 2425 2430	
ctg gca gtt tct cac gga atg aat gac agc ggt cag ttc caa ttg	7344
Leu Ala Val Ser His Gly Met Asn Asp Ser Gly Gln Phe Gln Leu	
2435 2440 2445	
gat ttc aac gat ggc aaa ttc ctg cca ttt gaa gga atc gaa atc	7389
Asp Phe Asn Asp Gly Lys Phe Leu Pro Phe Glu Gly Ile Glu Ile	
2450 2455 2460	
gat aaa ggt acg ctg aca tta agc ttc ccg aat gca acc gaa aaa	7434
Asp Lys Gly Thr Leu Thr Leu Ser Phe Pro Asn Ala Thr Glu Lys	
2465 2470 2475	
caa aaa acc atg ctg gag agt cta agc gac atc att ctg cat att	7479
Gln Lys Thr Met Leu Glu Ser Leu Ser Asp Ile Ile Leu His Ile	
2480 2485 2490	
cgc tac acc att cgc caa taa	7500
Arg Tyr Thr Ile Arg Gln	
2495	

&lt;210&gt; 4

&lt;211&gt; 2499

&lt;212&gt; PRT

&lt;213&gt; Photorhabdus luminescens

&lt;400&gt; 4

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Met Asn Thr Leu Lys Ser Glu Tyr Gln Gln Ala Leu Gly Ala Gly Phe
 1          5          10          15
Asn Asn Leu Thr Asp Ile Cys His Leu Ser Phe Asp Glu Leu Arg Lys
      20          25          30
Lys Val Lys Asp Lys Leu Ser Trp Ser Gln Thr Gln Ser Leu Tyr Leu
      35          40          45
Glu Ala Gln Gln Val Gln Lys Asp Asn Leu Leu His Glu Ala Arg Ile
 50          55          60
Leu Lys Arg Ala Asn Pro His Leu Gln Ser Ala Val His Leu Ala Leu
65          70          75          80
Thr Ala Pro His Ala Asp Gln Gln Gly Tyr Asn Ser Arg Phe Gly Asn
      85          90          95
Arg Ala Ser Lys Tyr Ala Ala Pro Gly Ala Ile Ser Ser Met Phe Ser
      100          105          110
Leu Ala Ala Tyr Leu Thr Glu Leu Tyr Arg Gln Ala Arg Asn Leu His
      115          120          125
Ala Glu Gly Ser Ile Tyr His Leu Asp Thr Arg Arg Pro Asp Leu Lys
      130          135          140
Ser Leu Val Leu Ser Gln Lys Asn Met Asn Thr Glu Ile Ser Thr Leu
145          150          155          160
Ser Leu Ser Asn Asn Met Leu Leu Asn Ser Ile Lys Thr Gln Pro Asn
      165          170          175
Leu Asn Ser His Ala Lys Val Met Glu Lys Leu Ser Thr Phe Arg Thr
      180          185          190
Ser Gly Ser Met Pro Tyr His Asp Ala Tyr Glu Ser Val Arg Lys Ile
      195          200          205
Ile Gln Leu Gln Ala Pro Val Phe Glu Gln Ser Ser Thr Leu Thr Asp
      210          215          220
Thr Pro Ile Thr Lys Leu Met Tyr Gln Ile Ser Leu Leu Gly Ile Asn
225          230          235          240
Ala Ser Val Ser Pro Glu Leu Phe Thr Ile Leu Thr Gln Lys Ile Lys
      245          250          255
Pro Ala Thr Asn Ala Asp Asn Thr Asn Glu Leu Lys Lys Leu Tyr Lys
      260          265          270
Lys Asn Phe Gly Glu Ile Lys Ser Ile Gln Met Ala Arg Ala Glu Tyr
      275          280          285

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Leu Lys Ser Tyr Tyr Asn Leu Thr Asp Lys Glu Leu Asn Gln Phe Ser  
 290 295 300  
 Lys Lys Ile Lys Gln Ile Asp Ser Leu Trp Asn Ile Gly Asp Glu Ile  
 305 310 315 320  
 Thr Gln Tyr His Leu Leu Lys Phe Asn Lys Ala Ile Asn Leu Ser Arg  
 325 330 335  
 Ser Thr Glu Leu Ser Pro Ile Ile Leu Asn Ser Ile Ala Ile Asp Ile  
 340 345 350  
 Leu Lys Lys Thr Pro Pro Glu Asp Asp Ser Asp Asn Pro Phe Arg Asp  
 355 360 365  
 Asp Pro Asp Tyr Leu Glu Ser Phe Gln Asp Leu Asp Leu Ser Asp Glu  
 370 375 380  
 Pro Asp Ile Asp Glu Asp Val Leu Arg Glu Ala Leu Arg Val Lys Asp  
 385 390 395 400  
 Tyr Met Gln Arg Tyr Gly Ile Asp Ala Glu Thr Ala Leu Ile Leu Cys  
 405 410 415  
 Lys Ala Pro Ile Ser Glu Asn Pro Ser His Pro Asp Leu Ser Lys Leu  
 420 425 430  
 Leu Ala Asp Ile His Gln Leu Thr Ile Asp Glu Leu Gly Val Leu Leu  
 435 440 445  
 Val Ala Ile Asp Glu Gly Lys Thr Asp Leu Ser Gln Ile Thr His Asp  
 450 455 460  
 Asn Leu Ala Val Leu Ile Ser Lys Leu Tyr Ser Val Thr Asn Trp Leu  
 465 470 475 480  
 Arg Thr Arg Lys Trp Ser Val Tyr Gln Leu Phe Val Met Thr Thr Asp  
 485 490 495  
 Lys Tyr Asn Lys Thr Leu Thr Pro Glu Ile Asn Asn Leu Leu Asp Thr  
 500 505 510  
 Val Tyr Asn Gly Leu Gln Asn Phe Tyr Lys Asp Asn Leu Leu Lys Ile  
 515 520 525  
 Lys Asp Asn Leu Leu Lys Ala Lys Glu Ser Leu Pro Glu Asp Lys Asp  
 530 535 540  
 Asn Leu Pro Lys Ala Glu Gln Tyr Leu Leu Glu Ala Glu Lys Tyr Leu  
 545 550 555 560  
 Leu Ala Ala Glu Lys Tyr Leu Leu Ala Ala Glu Lys Tyr Leu Leu Glu  
 565 570 575  
 Ala Asn Lys Asn Pro Leu Glu Ala Lys Lys Ala Leu Lys Glu Tyr Glu  
 580 585 590  
 Lys Asn Gln Glu Ala Tyr Glu Lys Asn Leu Lys Glu His Glu Lys Tyr  
 595 600 605  
 Leu Leu Lys Ala Gly Glu Asn Leu Pro Ala Ile Lys Glu Asn Leu Leu  
 610 615 620  
 Lys Ile Lys Glu Asn Leu Pro Lys Ala Ile Ser Pro Tyr Ile Ala Ala

625						630						635						640
Ala	Leu	Gln	Leu	Pro	Ser	Glu	Asn	Val	Ala	Leu	Ser	Val	Leu	Ala	Trp			
				645					650					655				
Ala	Asp	Lys	Leu	Asn	Ser	Gly	Lys	Glu	Asn	Lys	Met	Thr	Ala	Asp	Ser			
			660					665					670					
Phe	Trp	Asn	Trp	Leu	Arg	Lys	Lys	Pro	Ile	Glu	Thr	Gln	Ser	Lys	Thr			
		675					680					685						
Thr	Glu	Ala	Thr	Glu	Ala	Thr	Glu	Ala	Thr	Glu	Ala	Thr	Glu	Ala	Thr			
	690					695					700							
Glu	Ala	Thr	Glu	Lys	Thr	Thr	Leu	Ile	Gln	Gln	Ala	Val	Gln	Tyr	Cys			
705					710					715					720			
Gln	Cys	Leu	Ala	Gln	Leu	Ala	Leu	Ile	Tyr	Arg	Ser	Thr	Gly	Leu	Ser			
				725					730					735				
Glu	Ser	Thr	Leu	Arg	Leu	Phe	Val	Thr	Asn	Pro	Gln	Ile	Phe	Gly	Leu			
			740					745					750					
Thr	Ala	Lys	Thr	Thr	Ser	Thr	His	Asn	Val	Leu	Ser	Leu	Ile	Met	Leu			
		755					760					765						
Thr	Arg	Phe	Thr	Asp	Trp	Val	Asn	Ser	Leu	Gly	Glu	Asn	Ala	Ser	Ser			
	770					775					780							
Val	Leu	Thr	Glu	Phe	Glu	Lys	Gly	Thr	Leu	Thr	Ala	Glu	Leu	Leu	Ala			
785					790					795					800			
Asn	Ala	Met	Asn	Leu	Asp	Lys	Asn	Leu	Leu	Glu	Gln	Ala	Ser	Thr	Gln			
				805					810					815				
Ala	Gln	Ala	Asp	Phe	Ser	Asn	Trp	Pro	Ser	Ile	Asp	Asn	Leu	Leu	Gln			
			820					825					830					
Trp	Ile	Asn	Ile	Ser	Arg	Gln	Leu	Asn	Ile	Ser	Pro	Gln	Gly	Val	Ser			
		835					840					845						
Glu	Leu	Ala	Lys	Ile	Leu	Asp	Ile	Glu	Ser	Ser	Thr	Asn	Tyr	Ala	Gln			
	850					855					860							
Trp	Glu	Asn	Val	Ala	Ser	Ile	Leu	Thr	Ala	Gly	Leu	Asp	Thr	Gln	Lys			
865					870					875					880			
Ala	Asn	Thr	Leu	His	Ala	Phe	Leu	Gly	Glu	Ser	Arg	Ser	Thr	Ala	Leu			
				885					890					895				
Ser	Thr	Tyr	Tyr	Ile	Tyr	Ser	His	Asn	Gln	Lys	Asp	Arg	Glu	Glu	Arg			
			900					905					910					
Lys	His	Thr	Val	Ile	Lys	Asp	Arg	Asp	Asp	Leu	Tyr	Gln	Tyr	Leu	Leu			
		915					920					925						
Ile	Asp	Asn	Gln	Val	Ser	Ala	Ala	Ile	Lys	Thr	Thr	Glu	Ile	Ala	Glu			
	930					935					940							
Ala	Ile	Ala	Ser	Ile	Gln	Leu	Tyr	Ile	Asn	Arg	Ala	Leu	Lys	Asn	Met			
945					950					955					960			
Glu	Gly	Asp	Thr	Asp	Thr	Ser	Val	Thr	Ser	Arg	Leu	Phe	Phe	Thr	Asn			
				965					970					975				



Trp	Asp	Lys	Tyr	Asn	Lys	Arg	Tyr	Ser	Thr	Trp	Ala	Gly	Ile	Thr	Lys	980	985	990
Leu	Leu	Tyr	Tyr	Pro	Glu	Asn	Tyr	Ile	Asp	Pro	Thr	Leu	Arg	Ile	Gly	995	1000	1005
Gln	Thr	Lys	Met	Met	Asp	Thr	Leu	Leu	Gln	Ser	Ile	Ser	Gln	Ser		1010	1015	1020
Gln	Leu	Asn	Thr	Asp	Thr	Val	Glu	Asp	Ala	Phe	Lys	Ser	Tyr	Leu		1025	1030	1035
Thr	Ser	Phe	Glu	Gln	Val	Ala	Asn	Leu	Glu	Val	Ile	Ser	Ala	Tyr		1040	1045	1050
His	Asp	Asn	Ile	Asn	Asn	Asp	Gln	Gly	Leu	Thr	Tyr	Phe	Ile	Gly		1055	1060	1065
Arg	Ser	Lys	Thr	Glu	Val	Asn	Gln	Tyr	Tyr	Trp	Arg	Ser	Val	Asp		1070	1075	1080
His	Asn	Lys	Phe	Ser	Glu	Gly	Lys	Phe	Pro	Ala	Asn	Ala	Trp	Ser		1085	1090	1095
Glu	Trp	His	Lys	Ile	Asp	Cys	Pro	Ile	Asn	Pro	Tyr	Glu	Asp	Thr		1100	1105	1110
Ile	Arg	Pro	Val	Val	Tyr	Gln	Ser	Arg	Leu	Tyr	Ile	Ile	Trp	Leu		1115	1120	1125
Glu	Gln	Lys	Lys	Val	Thr	Asn	Arg	Ala	Glu	Gly	Glu	Ala	Ile	Lys		1130	1135	1140
Gln	Gly	Ser	Lys	Thr	Thr	Thr	Ser	Tyr	His	Tyr	Glu	Leu	Lys	Leu		1145	1150	1155
Ala	His	Ile	Arg	Tyr	Asp	Gly	Thr	Trp	Asn	Thr	Pro	Ile	Thr	Phe		1160	1165	1170
Asp	Val	Asp	Glu	Lys	Ile	Ser	Gly	Leu	Asn	Leu	Glu	Leu	Asn	Lys		1175	1180	1185
Ala	Leu	Gly	Leu	Tyr	Cys	Ala	Ser	Tyr	Gln	Gly	Lys	Asp	Lys	Leu		1190	1195	1200
Leu	Val	Met	Phe	Tyr	Lys	Lys	Gln	Glu	Gln	Leu	Asn	Asn	Tyr	Thr		1205	1210	1215
Glu	Lys	Thr	Gly	Asn	Thr	Tyr	Thr	Ala	Pro	Ile	Lys	Gly	Leu	Tyr		1220	1225	1230
Ile	Thr	Ser	Asn	Met	Ser	Pro	Glu	Glu	Met	Thr	Pro	Glu	Ser	Tyr		1235	1240	1245
Arg	Leu	Asn	Ala	His	Lys	Gln	Phe	Asp	Thr	Asn	Asn	Val	Val	Arg		1250	1255	1260
Val	Asn	Asn	Arg	Tyr	Ala	Glu	Ser	Tyr	Glu	Ile	Pro	Ser	Ser	Val		1265	1270	1275
Asn	Ser	Asn	Asn	Gly	Tyr	Asp	Trp	Gly	Glu	Gly	Tyr	Leu	Ser	Met		1280	1285	1290

Val	Tyr	Gly	Gly	Ser	Ile	Leu	Ile	Thr	Arg	Asp	Pro	Ser	Asp	Asn
1295						1300					1305			
Ser	Lys	Ile	Gln	Ile	Ser	Pro	Lys	Leu	Arg	Ile	Ile	His	Asn	Gly
1310						1315					1320			
Tyr	Glu	Gly	Arg	Gln	Arg	Asn	Gln	Cys	Asn	Leu	Met	Lys	Lys	Tyr
1325						1330					1335			
Gly	Lys	Leu	Gly	Asp	Lys	Phe	Ile	Ile	Tyr	Thr	Thr	Leu	Gly	Ile
1340						1345					1350			
Asn	Pro	Asn	Asn	Leu	Ser	Asn	Lys	Lys	Leu	Ile	Tyr	Pro	Val	Tyr
1355						1360					1365			
Gln	Tyr	Glu	Gly	Asn	Glu	Ser	Lys	Leu	Ser	Gln	Gly	Arg	Leu	Leu
1370						1375					1380			
Phe	Tyr	Arg	Asp	Ser	Thr	Thr	Asn	Phe	Thr	Arg	Ala	Trp	Phe	Pro
1385						1390					1395			
Asn	Leu	Ser	Ser	Asp	Ser	Lys	Glu	Met	Ser	Ile	Thr	Thr	Gly	Gly
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Asn	Ile	Ser	Gly	Asn	Tyr	Gly	Tyr	Ile	Asp	Asn	Lys	His	Ser	Asp
1415						1420					1425			
Asn	Lys	Pro	Phe	Glu	Glu	Tyr	Phe	Tyr	Met	Asp	Asp	His	Gly	Gly
1430						1435					1440			
Ile	Asp	Thr	Asp	Val	Ser	Glu	Pro	Ile	Phe	Ile	Asn	Thr	Lys	Ile
1445						1450					1455			
Gln	Pro	Ser	Asn	Val	Lys	Ile	Ile	Val	Lys	Thr	Val	Lys	Asp	Asp
1460						1465					1470			
Gly	Lys	Leu	Asp	Ser	Lys	Pro	Tyr	Ile	Ala	Glu	Asp	Lys	Val	Ser
1475						1480					1485			
Val	Lys	Pro	Thr	Pro	Asn	Phe	Glu	Glu	Met	Cys	Tyr	Gln	Phe	Asn
1490						1495					1500			
Asn	Leu	Asp	Gln	Ile	Asp	Val	Ser	Thr	Leu	Val	Phe	Lys	Asn	Asn
1505						1510					1515			
Glu	Ala	Ser	Ile	Asp	Ile	Thr	Phe	Thr	Ala	Ser	Ala	Asp	Ala	Phe
1520						1525					1530			
Glu	Ser	Gly	Lys	Glu	Gln	Arg	Asn	Leu	Gly	Glu	Glu	His	Phe	Ser
1535						1540					1545			
Ile	Arg	Ile	Ile	Lys	Lys	Ala	Asn	Val	Asn	Asp	Val	Leu	Thr	Leu
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His	His	Asp	Pro	Ser	Gly	Ala	Gln	Tyr	Met	Gln	Trp	Gly	Ala	Tyr
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Arg	Thr	Arg	Leu	Asn	Thr	Leu	Phe	Ala	Arg	Lys	Leu	Ile	Ser	Arg
1580						1585					1590			
Ala	Asn	Ala	Gly	Ile	Asp	Thr	Ile	Leu	Ser	Met	Glu	Thr	Gln	Asn
1595						1600					1605			
Ile	Gln	Glu	Pro	Gln	Leu	Gly	Lys	Gly	Phe	Tyr	Val	Asn	Phe	Thr

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Leu	Pro	Lys	Tyr	Asp	Gln	Asn	Thr	His	Gly	Asn	Glu	Arg	Gln	Phe
1625						1630					1635			
Lys	Ile	His	Ile	Gly	Asn	Ile	Ala	Gly	Asp	Asn	Thr	Met	Arg	Pro
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Tyr	Tyr	Gln	Gly	Ile	Leu	Ala	Asp	Thr	Glu	Thr	Ser	Val	Val	Leu
1655						1660					1665			
Phe	Val	Pro	Tyr	Glu	Lys	Gln	Ser	Tyr	Thr	Asn	Glu	Gly	Val	Arg
1670						1675					1680			
Leu	Gly	Val	Glu	Tyr	Lys	Lys	Val	Ser	Tyr	Leu	Gly	Val	Trp	Glu
1685						1690					1695			
Pro	Ala	Phe	Phe	Tyr	Phe	Asn	Glu	Ile	Gln	Gln	Lys	Phe	Ile	Leu
1700						1705					1710			
Ile	Asn	Asp	Ala	Asp	His	Asn	Ser	Ala	Met	Thr	Gln	Ser	Gly	Glu
1715						1720					1725			
Lys	Thr	Gly	Ile	Lys	Lys	Tyr	Lys	Gly	Phe	Leu	Asp	Val	Ser	Ile
1730						1735					1740			
Leu	Ile	Asp	His	Gln	His	Thr	Glu	Pro	Met	Asp	Phe	Asn	Gly	Ala
1745						1750					1755			
Asn	Ser	Leu	Tyr	Phe	Trp	Glu	Leu	Phe	Tyr	Tyr	Thr	Pro	Met	Leu
1760						1765					1770			
Ile	Ala	Gln	Arg	Leu	Leu	His	Glu	Gln	Asn	Phe	Asp	Glu	Ala	Asn
1775						1780					1785			
Arg	Trp	Leu	Lys	Tyr	Val	Trp	Asn	Pro	Ser	Gly	His	Ile	Ala	Asn
1790						1795					1800			
Gly	Gln	Lys	Gln	His	Pro	His	Asn	Trp	Asn	Val	Arg	Pro	Leu	Gln
1805						1810					1815			
Glu	Asp	Thr	Ser	Trp	Asn	Asp	Asp	Pro	Leu	Asp	Thr	Phe	Asp	Pro
1820						1825					1830			
Asp	Ala	Ile	Ala	Gln	His	Asp	Pro	Met	His	Tyr	Lys	Val	Ala	Thr
1835						1840					1845			
Phe	Met	Cys	Ala	Leu	Asp	Leu	Leu	Ile	Glu	Gln	Gly	Asp	Tyr	Ala
1850						1855					1860			
Tyr	Arg	Gln	Leu	Glu	Arg	Asp	Thr	Leu	Ala	Glu	Ala	Lys	Met	Trp
1865						1870					1875			
Tyr	Met	Gln	Ala	Leu	His	Leu	Leu	Gly	Asp	Lys	Pro	His	Leu	Leu
1880						1885					1890			
Leu	Ser	Ser	Thr	Trp	Ser	Asp	Pro	Glu	Leu	Lys	Glu	Ala	Ala	Asp
1895						1900					1905			
Leu	Glu	Lys	Gln	Gln	Ala	His	Ala	Lys	Ala	Ile	Ala	Asp	Leu	Arg
1910						1915					1920			
Gln	Gly	Gln	Pro	Lys	Asp	Gly	Ser	Asn	Thr	Asp	Leu	Phe	Leu	Pro
1925						1930					1935			

Gln Val 1940	Asn Glu Val Met 1945	Leu Ser Tyr Trp Gln Lys 1950	Leu Glu Gln
Arg Leu 1955	Tyr Asn Leu Arg His 1960	Asn Leu Ser Ile Asp 1965	Gly Gln Pro
Leu His 1970	Leu Pro Ile Phe Ala 1975	Thr Pro Ala Asp Pro 1980	Lys Ala Leu
Leu Ser 1985	Ala Ala Val Ala Ser 1990	Ser Gln Gly Gly Ser 1995	Asn Leu Pro
Ser Glu 2000	Phe Ile Ser Val Trp 2005	Arg Phe Pro His Met 2010	Leu Glu Asn
Ala Arg 2015	Ser Met Val Ser Gln 2020	Leu Thr Gln Phe Gly 2025	Ser Thr Leu
Gln Asn 2030	Ile Ile Glu Arg Gln 2035	Asp Ala Glu Ala Leu 2040	Asn Thr Leu
Leu Gln 2045	Asn Gln Ala Ala Glu 2050	Leu Ile Leu Thr Asn 2055	Leu Ser Ile
Gln Asp 2060	Lys Thr Ile Glu Glu 2065	Leu Asp Val Glu Lys 2070	Thr Val Leu
Glu Lys 2075	Thr Arg Ala Gly Ala 2080	Lys Ser Arg Phe Asp 2085	Ser Tyr Ser
Lys Phe 2090	Tyr Asp Glu Asp Ile 2095	Asn Ala Gly Glu Lys 2100	Gln Ala Met
Ala Leu 2105	Arg Ala Ser Val Ala 2110	Gly Ile Ser Thr Ala 2115	Leu Gln Ala
Ser His 2120	Leu Ala Gly Ala Ala 2125	Leu Asp Leu Ala Pro 2130	Asn Ile Phe
Gly Phe 2135	Ala Asp Gly Gly Ser 2140	His Trp Gly Ala Ile 2145	Ala Gln Ala
Thr Ser 2150	Asn Val Met Glu Phe 2155	Ser Ala Ser Val Met 2160	Ser Thr Glu
Ala Asp 2165	Lys Ile Ser Gln Ser 2170	Glu Ala Tyr Arg Arg 2175	Arg Arg Gln
Glu Trp 2180	Lys Ile Gln Arg Asn 2185	Asn Ala Asp Ala Glu 2190	Leu Lys Gln
Ile Asp 2195	Ala Gln Leu Gln Ser 2200	Leu Val Val Arg Arg 2205	Glu Ala Ala
Val Leu 2210	Gln Lys Thr Ser Leu 2215	Lys Thr Gln Gln Glu 2220	Gln Thr His
Ala Gln 2225	Leu Thr Phe Leu Gln 2230	His Lys Phe Ser Asn 2235	Gln Ala Leu
Tyr Asn 2240	Trp Leu Arg Gly Arg 2245	Leu Ser Ala Ile Tyr 2250	Phe Gln Phe

Tyr Asp Leu Ala Val Ala Arg Cys Leu Met Ala Glu Met Ala Tyr  
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 Arg Trp Glu Thr Asn Asp Ala Ala Ala Arg Phe Ile Lys Pro Gly  
 2270 2275 2280  
 Ala Trp Gln Gly Thr His Ala Gly Leu Leu Ala Gly Glu Thr Leu  
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 Met Leu Asn Leu Ala Gln Met Glu Asp Ala His Leu Lys Gln Glu  
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Lys Ala Asn Arg Leu His Glu Ala Ser Ile Leu Lys Arg Ala Asn Pro	
20 25 30	
caa tta caa aat gcg gta cat ctt gct tta acc aca ccc cat gct gac	144
Gln Leu Gln Asn Ala Val His Leu Ala Leu Thr Thr Pro His Ala Asp	
35 40 45	
cag caa ggt tat aac agt aaa ttt ggt ggc cgc gcc agc cag tat gtc	192
Gln Gln Gly Tyr Asn Ser Lys Phe Gly Gly Arg Ala Ser Gln Tyr Val	
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gct ccc ggc gca gtt gct tcc atg ttc tct ccc gcc gct tat ctg acc	240
Ala Pro Gly Ala Val Ala Ser Met Phe Ser Pro Ala Ala Tyr Leu Thr	
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gaa ctt tat cgt cag gca cag gat tta cat aaa aaa gag tcc att tat	288
Glu Leu Tyr Arg Gln Ala Gln Asp Leu His Lys Lys Glu Ser Ile Tyr	
85 90 95	
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His Leu Asp Lys Arg Arg Pro Asp Leu Lys Ser Leu Thr Leu Ser Gln	
100 105 110	
caa aat atg gat gat gaa gtt tct aca ctt tct cta tct aat aag gtg	384
Gln Asn Met Asp Asp Glu Val Ser Thr Leu Ser Leu Ser Asn Lys Val	
115 120 125	
ttg ctg gaa ggg atc aag acg ctg acc ggg ctg gaa ggc cat act aac	432
Leu Leu Glu Gly Ile Lys Thr Leu Thr Gly Leu Glu Gly His Thr Asn	
130 135 140	
gtg atg aaa gcg cta tca acc ttt cgc tct tct ggc tct ctg cca tat	480
Val Met Lys Ala Leu Ser Thr Phe Arg Ser Ser Gly Ser Leu Pro Tyr	
145 150 155 160	
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His Asp Ala Tyr Glu Ser Val Arg Lys Val Ile Gln Leu Gln Ala Pro	
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Ile Phe Asp Gln Val Gly Pro Ser Pro Glu Thr Asp Ile Ala Asn Leu	
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Thr Tyr Gln Ala Ser Leu Leu Gly Ile Asn Ala Ser Val Leu Pro Glu	
195 200 205	
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Leu Phe Lys Thr Leu Thr Glu Glu Ile Thr Glu Val Asn Ala Asn Glu	
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Lys Phe Lys Lys Asn Phe Gly Asp Arg Glu Pro Ser Glu Leu Leu Thr	
225 230 235 240	
ctg gat gcc ttg aaa cac tat tac aat tta acc aat gaa gaa tta gaa	768

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Gln	Phe	Leu	Asn	His	Val	Leu	Ile	Glu	Ser	Asn	Ser	Thr	Tyr	Thr	Asn	
			260					265				270				
aac	caa	ctt	att	aat	ata	agc	att	gat	aca	tca	ggg	aag	ata	caa	ttg	864
Asn	Gln	Leu	Ile	Asn	Ile	Ser	Ile	Asp	Thr	Ser	Gly	Lys	Ile	Gln	Leu	
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agc	cgc	ata	aca	cga	aca	cct	gac	tta	aat	tat	aac	aac	ctc	aat	tac	912
Ser	Arg	Ile	Thr	Arg	Thr	Pro	Asp	Leu	Asn	Tyr	Asn	Asn	Leu	Asn	Tyr	
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Tyr	Lys	Lys	Lys	Ala	Gly	Gln	Val	Ser	Ile	Arg	Leu	Ser	Lys	Pro	Gln	
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Ser	Lys	Tyr	Leu	Lys	Gly	Ile	Tyr	Lys	Ala	Thr	Ile	Glu	Asn	Thr	Asn	
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Tyr	Ser	Ser	Pro	Thr	Phe	Glu	Leu	Thr	Asp	Lys	Asp	Ile	Gln	Lys	Glu	
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Phe	Thr	Leu	Leu	Ser	Tyr	Arg	Tyr	Lys	Glu	Asn	Ser	Asp	Ser	Asn	Ile	
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Ser	Asp	Ser	Ser	Tyr	Ala	Lys	Phe	Lys	Ile	Gln	Asp	Tyr	Ser	Pro	Ala	
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Ile	Phe	Leu	Leu	Lys	Leu	Asn	Lys	Thr	Ile	Arg	Leu	Ser	His	Ala	Thr	
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Tyr	Tyr	Met	Gln	Arg	Tyr	Gly	Ile	Asp	Ala	Glu	Thr	Ala	Leu	Val	Leu	
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Cys	Lys	Val	Ser	Thr	Asn	Ile	Ile	Asn	Pro	Ser	Ser	Ser	Asp	Leu	Ile	
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Lys	Leu	Leu	Ala	Asn	Ile	His	Gln	Leu	Thr	Val	Asn	Glu	Leu	Asn	Leu	
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Asp	Asn	Asn	Leu	Ser	Val	Leu	Ile	Asp	Lys	Leu	Tyr	Ser	Ile	Thr	Gln		
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Trp	Leu	Arg	Thr	Arg	Lys	Trp	Asn	Met	Tyr	Leu	Leu	Phe	Met	Met	Thr		
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acc	acc	gac	tat	aac	caa	acc	ctg	acg	ccg	gaa	att	cag	aac	ctg	cta		1680
Thr	Thr	Asp	Tyr	Asn	Gln	Thr	Leu	Thr	Pro	Glu	Ile	Gln	Asn	Leu	Leu		
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Asn	Leu	Leu	Leu	Lys	Ile	Ser	Pro	Tyr	Ile	Ala	Ala	Ala	Leu	Gln	Leu		
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Pro	Ser	Glu	Asn	Thr	Ala	Tyr	Tyr	Ile	Leu	Asn	Trp	Ala	Asp	Gln	Leu		
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Lys	Pro	Gly	Ser	Gly	Ala	Met	Thr	Ala	Thr	Lys	Phe	Trp	Glu	Trp	Leu		
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Gln	Ala	Ser	His	Asn	Pro	Glu	Gln	Ser	Thr	Ala	Ile	Thr	Glu	Glu	Gln		
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gca	gtc	caa	tat	tgc	caa	tgc	ctg	gca	caa	ttg	gca	ctg	att	tat	cgt		1968
Ala	Val	Gln	Tyr	Cys	Gln	Cys	Leu	Ala	Gln	Leu	Ala	Leu	Ile	Tyr	Arg		
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Ser	Leu	Ile	Lys	Leu	Thr	Arg	Phe	Thr	Asp	Trp	Val	Asn	Ser	Leu	Gly		
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Ala	Glu	Leu	Leu	Ala	Asn	Ala	Leu	Ser	Leu	Asp	Lys	Asn	Leu	Leu	Glu		
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Gln	Ala	Ser	Asn	Gln	Ala	Gln	Val	Asn	Phe	Thr	Asp	Trp	Pro	Ser	Ile		
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Pro	Gln	Ala	Val	Ser	Ala	Leu	Ala	Gln	Val	Leu	Thr	Thr	Glu	Ser	Ser		
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Thr	Lys	Met	Met	Asp	Thr	Leu	Leu	Gln	Ser	Ile	Ser	Gln	Ser	Gln	Leu		
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Leu	Val	Met	Phe	Tyr	Arg	Lys	Arg	Asp	Glu	Leu	Asp	Glu	Tyr	Lys	
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Ile	Ala	Lys	Lys	Ile	Asp	Arg	Glu	Asp	Gly	Ile	Ser	Val	Ser	Asp	
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Gln	Glu	Leu	Met	Gln	Gly	Val	Tyr	Ile	Ser	Ser	Asn	Met	Leu	Leu	
	1190					1195					1200				
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Glu	Asn	Ile	Glu	Ser	Glu	Gln	Tyr	Lys	Asn	Ile	Tyr	Glu	Leu	Thr	
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Tyr	Ser	Lys	Phe	Asp	Ile	Asn	Asn	Ile	Ile	Lys	Val	Asn	Ser	Trp	
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Asn	Pro	Val	Thr	Asp	Glu	Val	Asn	Asp	Asp	Asn	Ile	Leu	Thr	Val	
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His	Asn	Asp	Thr	Asn	Gly	Ala	Gln	Tyr	Met	Gln	Ser	Gly	Gly	Tyr	
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Arg	Thr	Arg	Leu	Asn	Thr	Leu	Phe	Ala	Arg	Lys	Leu	Ile	Ser	Arg	
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Ala	Thr	Ala	Gly	Ile	Asp	Thr	Ile	Leu	Asn	Ile	Glu	Thr	Gln	Lys	
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Leu	Pro	Glu	Pro	Gln	Leu	Gly	Lys	Gly	Phe	Phe	Thr	Asn	Leu	Ile	
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Leu	Pro	Lys	Tyr	Asp	Gln	Asn	Val	His	Gly	Ser	Glu	Arg	Trp	Phe	
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Lys	Ile	His	Ile	Arg	Asn	Asp	Asn	Lys	Met	Met	Asn	Leu	Tyr	His	
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Lys	Gly	Thr	Leu	Thr	Asp	Thr	Glu	Thr	Ser	Val	Thr	Leu	Phe	Ile	
	1340					1345					1350				
cct	tgg	tct	aat	aca	caa	gaa	cgc	gtc	gaa	ata	gca	gta	gaa	tat	4104
Pro	Trp	Ser	Asn	Thr	Gln	Glu	Arg	Val	Glu	Ile	Ala	Val	Glu	Tyr	
	1355					1360					1365				
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Asn	Lys	Lys	Phe	Tyr	Lys	Asp	Gln	Gln	Asn	Trp	Glu	Thr	Ala	Leu	
	1370					1375					1380				
ttt	cat	ttt	aat	gaa	act	aat	cag	aaa	ttt	atg	ttg	gtt	aat	gat	4194
Phe	His	Phe	Asn	Glu	Thr	Asn	Gln	Lys	Phe	Met	Leu	Val	Asn	Asp	
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gct	gat	aat	aag	caa	gta	gta	ata	aac	gat	act	gat	gca	atc	gtc	4239
Ala	Asp	Asn	Lys	Gln	Val	Val	Ile	Asn	Asp	Thr	Asp	Ala	Ile	Val	
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Asn	Lys	Tyr	Lys	Gly	Phe	Leu	Asp	Val	Ser	Ile	Leu	Ile	Asp	Gln	
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His	Thr	Glu	Pro	Met	Asp	Phe	Ser	Gly	Ala	Asn	Ser	Leu	Tyr	Phe	
	1430					1435					1440				
tgg	gaa	cta	ttc	tac	tat	gcc	cca	atg	ctg	att	gct	cag	cgc	ctg	4374
Trp	Glu	Leu	Phe	Tyr	Tyr	Ala	Pro	Met	Leu	Ile	Ala	Gln	Arg	Leu	
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Leu	His	Glu	Gln	His	Phe	Asp	Glu	Ala	Asn	Arg	Trp	Leu	Lys	Tyr	
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Ile	Trp	Asn	Pro	Ser	Gly	Tyr	Ile	Glu	His	Gly	Gln	Ile	Gln	His	
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Tyr	Arg	Trp	Asn	Val	Arg	Pro	Leu	Leu	Glu	Asp	Ile	Ser	Trp	Asn	
	1490					1495					1500				
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Asp	Asp	Pro	Leu	Asn	Ser	Val	Asp	Pro	Asp	Ala	Ile	Ala	Gln	Tyr	
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gat	cca	atg	cac	tat	aaa	gtc	gtt	act	ttt	atg	cgc	acc	ctt	gat	4599
Asp	Pro	Met	His	Tyr	Lys	Val	Val	Thr	Phe	Met	Arg	Thr	Leu	Asp	
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Leu	Leu	Leu	Asp	Arg	Gly	Asp	Tyr	Ala	Tyr	Arg	Gln	Leu	Glu	Arg	
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Asp	Thr	Leu	Asn	Glu	Ala	Lys	Met	Trp	Tyr	Met	Gln	Ala	Leu	His	
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Gln	Ala	His	Ala	Met	Thr	Ala	Leu	Arg	Gln	Gly	Asp	Ile	Ser	Arg	
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His	Asn	His	Pro	Thr	Asp	Leu	Phe	Leu	Pro	Gln	Val	Asn	Glu	Val	
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Met	Gln	Asn	Tyr	Trp	Gln	Lys	Leu	Glu	Gln	Arg	Leu	Tyr	Asn	Leu	
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Arg	His	Asn	Leu	Ser	Ile	Asp	Gly	Gln	Leu	Leu	His	Leu	Pro	Ile	
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Tyr	Ala	Thr	Pro	Ala	Asp	Pro	Lys	Ala	Leu	Leu	Ser	Ala	Ala	Val	
	1655					1660					1665				
gcc	aac	tca	caa	ggc	gga	agc	aag	tta	cca	atg	tca	ttt	atg	tca	5049
Ala	Asn	Ser	Gln	Gly	Gly	Ser	Lys	Leu	Pro	Met	Ser	Phe	Met	Ser	
	1670					1675					1680				
ctg	tgg	cgt	ttc	cca	cag	atg	ttg	gaa	aac	gcg	cgc	ggc	atg	gta	5094
Leu	Trp	Arg	Phe	Pro	Gln	Met	Leu	Glu	Asn	Ala	Arg	Gly	Met	Val	
	1685					1690					1695				
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Ser	Gln	Leu	Thr	Gln	Phe	Gly	Ser	Thr	Leu	Gln	Asn	Ile	Ile	Glu	
	1700					1705					1710				
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Arg	Gln	Asp	Ala	Glu	Ala	Leu	Asn	Thr	Leu	Leu	Gln	Asn	Gln	Ala	
	1715					1720					1725				
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Ala	Glu	Leu	Ile	Leu	Thr	Asn	Leu	Ser	Ile	Gln	Asp	Lys	Thr	Leu	
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Glu	Glu	Leu	Asp	Ala	Glu	Lys	Ile	Val	Leu	Glu	Lys	Ser	Lys	Ala	
	1745					1750					1755				
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Gly	Ala	Gln	Ser	Arg	Phe	Asn	Ser	Tyr	Lys	Lys	Leu	Tyr	Asp	Glu	
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Asn	Ile	Asn	Ala	Gly	Glu	Asn	Arg	Val	Ile	Ala	Leu	His	Ser	Ser	
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Val	Ala	Gly	Leu	Ser	Thr	Ala	Leu	Gln	Ala	Ser	Arg	Leu	Ala	Gly	
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Ala	Ala	Leu	Asp	Leu	Ala	Pro	Asn	Ile	Phe	Gly	Phe	Ala	Asp	Gly	
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Gly	Ser	Arg	Trp	Gly	Ala	Ile	Ala	Glu	Ala	Thr	Gly	Asn	Val	Met	
	1820					1825					1830				
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Glu	Phe	Ser	Ala	Asn	Val	Met	Asn	Thr	Glu	Ala	Asp	Lys	Ile	Ser	
	1835					1840					1845				
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Gln	Ser	Glu	Thr	Tyr	Arg	Arg	Arg	Arg	Gln	Glu	Trp	Glu	Ile	Gln	
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Arg	Asn	Asn	Ala	Glu	Ala	Glu	Ile	Lys	Gln	Ile	Asp	Ala	Gln	Leu	
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Gln	Ser	Leu	Ala	Val	Arg	Arg	Glu	Ala	Ala	Val	Leu	Gln	Lys	Thr	
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Ser	Leu	Lys	Thr	Gln	Gln	Glu	Gln	Thr	Gln	Ala	Gln	Leu	Thr	Phe	
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Leu	Gln	Arg	Lys	Phe	Ser	Asn	Gln	Ala	Leu	Tyr	His	Trp	Leu	Arg	
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Gly	Arg	Leu	Ala	Ala	Ile	Tyr	Phe	Gln	Phe	Tyr	Asp	Leu	Ala	Val	
	1925					1930					1935				
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Thr	Arg	Cys	Leu	Met	Ala	Glu	Met	Ala	Tyr	Arg	Trp	Glu	Thr	His	
	1940					1945					1950				
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Gln	Met	Glu	Asp	Ala	Tyr	Leu	Arg	Trp	Asp	Gln	Arg	Ala	Leu	Glu	
	1985					1990					1995				
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Val	Glu	Arg	Thr	Ile	Ser	Leu	Ala	Gln	Leu	Tyr	Gly	Thr	Leu	Pro	
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Glu	Lys	Ser	Phe	Asn	Leu	Ala	Thr	Arg	Ile	Ser	Ala	Leu	Leu	Thr	
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Gly	Ser	Thr	Thr	Glu	Pro	Val	Glu	Glu	His	Pro	Val	Thr	Leu	Glu	
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Ile	Lys	Gln	Ile	Ser	Val	Thr	Leu	Pro	Ala	Leu	Leu	Gly	Pro	Tyr	
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Gln	Asn	Val	Gln	Ala	Ile	Leu	Ala	Tyr	Glu	Gly	Ser	Glu	Ile	Gly	
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Leu	Ala	Glu	Ser	Cys	Lys	Ser	Leu	Ala	Ile	Ser	His	Gly	Val	Asn	
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Asp	Ser	Gly	Gln	Phe	Gln	Leu	Asp	Phe	Asn	Asn	Gly	Lys	Phe	Leu	
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Pro	Phe	Glu	Gly	Ile	Ala	Ile	Asn	Asp	Thr	Gly	Thr	Leu	Thr	Leu	
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Asn	Phe	Pro	Asn	Ala	Thr	Gly	Lys	Gln	Gln	Ala	Met	Leu	Gln	Ala	
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Leu	Ser	Asp	Ile	Ile	Leu	His	Ile	Arg	Tyr	Thr	Ile	Arg	Gln		
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&lt;210&gt; 6

&lt;211&gt; 2177

&lt;212&gt; PRT

&lt;213&gt; Photorhabdus luminescens

&lt;400&gt; 6

Met	Ser	Thr	Ile	Thr	Pro	Glu	His	Pro	Glu	Met	Ala	Gln	Gln	Ala	Gln	
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Lys	Ala	Asn	Arg	Leu	His	Glu	Ala	Ser	Ile	Leu	Lys	Arg	Ala	Asn	Pro	
		20						25					30			
Gln	Leu	Gln	Asn	Ala	Val	His	Leu	Ala	Leu	Thr	Thr	Pro	His	Ala	Asp	
		35					40					45				
Gln	Gln	Gly	Tyr	Asn	Ser	Lys	Phe	Gly	Gly	Arg	Ala	Ser	Gln	Tyr	Val	
	50					55					60					
Ala	Pro	Gly	Ala	Val	Ala	Ser	Met	Phe	Ser	Pro	Ala	Ala	Tyr	Leu	Thr	
65					70					75					80	
Glu	Leu	Tyr	Arg	Gln	Ala	Gln	Asp	Leu	His	Lys	Lys	Glu	Ser	Ile	Tyr	
				85					90					95		
His	Leu	Asp	Lys	Arg	Arg	Pro	Asp	Leu	Lys	Ser	Leu	Thr	Leu	Ser	Gln	
			100					105					110			
Gln	Asn	Met	Asp	Asp	Glu	Val	Ser	Thr	Leu	Ser	Leu	Ser	Asn	Lys	Val	
		115					120					125				
Leu	Leu	Glu	Gly	Ile	Lys	Thr	Leu	Thr	Gly	Leu	Glu	Gly	His	Thr	Asn	
	130					135					140					
Val	Met	Lys	Ala	Leu	Ser	Thr	Phe	Arg	Ser	Ser	Gly	Ser	Leu	Pro	Tyr	
145					150					155					160	
His	Asp	Ala	Tyr	Glu	Ser	Val	Arg	Lys	Val	Ile	Gln	Leu	Gln	Ala	Pro	
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Ile	Phe	Asp	Gln	Val	Gly	Pro	Ser	Pro	Glu	Thr	Asp	Ile	Ala	Asn	Leu	
			180					185					190			
Thr	Tyr	Gln	Ala	Ser	Leu	Leu	Gly	Ile	Asn	Ala	Ser	Val	Leu	Pro	Glu	
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	210					215					220					
Lys	Phe	Lys	Lys	Asn	Phe	Gly	Asp	Arg	Glu	Pro	Ser	Glu	Leu	Leu	Thr	
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Leu	Asp	Ala	Leu	Lys	His	Tyr	Tyr	Asn	Leu	Thr	Asn	Glu	Glu	Leu	Glu	
				245					250					255		
Gln	Phe	Leu	Asn	His	Val	Leu	Ile	Glu	Ser	Asn	Ser	Thr	Tyr	Thr	Asn	
			260					265					270			
Asn	Gln	Leu	Ile	Asn	Ile	Ser	Ile	Asp	Thr	Ser	Gly	Lys	Ile	Gln	Leu	
		275					280					285				
Ser	Arg	Ile	Thr	Arg	Thr	Pro	Asp	Leu	Asn	Tyr	Asn	Asn	Leu	Asn	Tyr	
	290					295					300					
Met	Asn	Leu	Tyr	Pro	Ile	Gln	Asn	Arg	Arg	Phe	Tyr	Val	Asp	Ile	Ser	
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Tyr	Lys	Lys	Lys	Ala	Gly	Gln	Val	Ser	Ile	Arg	Leu	Ser	Lys	Pro	Gln	
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Ser Lys Tyr Leu Lys Gly Ile Tyr Lys Ala Thr Ile Glu Asn Thr Asn  
 340 345 350  
 Tyr Ser Ser Pro Thr Phe Glu Leu Thr Asp Lys Asp Ile Gln Lys Glu  
 355 360 365  
 Phe Thr Leu Leu Ser Tyr Arg Tyr Lys Glu Asn Ser Asp Ser Asn Ile  
 370 375 380  
 Ser Asp Ser Ser Tyr Ala Lys Phe Lys Ile Gln Asp Tyr Ser Pro Ala  
 385 390 395 400  
 Ile Phe Leu Leu Lys Leu Asn Lys Thr Ile Arg Leu Ser His Ala Thr  
 405 410 415  
 Lys Leu Leu Pro Thr Val Leu Glu Lys Ile Val Phe Asn Ile Asn Gln  
 420 425 430  
 Lys Leu Asp Ile Asn Ala Glu Ile Leu Lys Lys Ile Phe Arg Val Lys  
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 Tyr Tyr Met Gln Arg Tyr Gly Ile Asp Ala Glu Thr Ala Leu Val Leu  
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 Cys Lys Val Ser Thr Asn Ile Ile Asn Pro Ser Ser Ser Asp Leu Ile  
 465 470 475 480  
 Lys Leu Leu Ala Asn Ile His Gln Leu Thr Val Asn Glu Leu Asn Leu  
 485 490 495  
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Gly Ile Asn Cys Leu Thr Asp Ile Cys His Tyr Ser Phe Asn Glu Phe	
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cgt cag caa gtc tct gat cat ctc tcc tgg tca gag acc aac cgc tta	144

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ctg Leu	cat His	aca Thr 515	caa Gln	aag Lys	tgg Trp	agt Ser	atc Ile 520	tat Tyr	cag Gln	tta Leu	ttt Phe	ttg Leu 525	atg Met	acc Thr	acc Thr	1584
acc Thr 530	aac Asn	tat Tyr	gac Asp	aaa Lys	aca Thr	cta Leu 535	acg Thr	cct Pro	gaa Glu	att Ile	caa Gln 540	aac Asn	tta Leu	ctc Leu	gat Asp	1632
acg Leu	gtc Leu	tac Leu	aat Leu	ggc Leu	tta Leu	cag Leu	aac Leu	ttc Leu	gat Leu	aaa Leu	aat Leu	aaa Leu	acc Leu	aaa Leu	ctt Leu	1680

Thr 545	Val	Tyr	Asn	Gly	Leu 550	Gln	Asn	Phe	Asp	Lys 555	Asn	Lys	Thr	Lys	Leu 560	
ctg Leu	gca Ala	gcc Ala	atc Ile	gcg Ala 565	cct Pro	tat Tyr	att Ile	gct Ala	gca Ala 570	aca Thr	cta Leu	caa Gln	tta Leu	cca Pro 575	tct Ser	1728
gaa Glu	aat Asn	gtc Val	gca Ala 580	cat His	tct Ser	att Ile	ctt Leu	ctc Leu 585	tgg Trp	gct Ala	gat Asp	aag Lys	ata Ile 590	aaa Lys	cca Pro	1776
agc Ser	gaa Glu	aat Asn 595	aaa Lys	ata Ile	acg Thr	gca Ala	gaa Glu 600	aaa Lys	ttt Phe	tgg Trp	atc Ile	tgg Trp 605	tta Leu	caa Gln	aat Asn	1824
aga Arg	gat Asp 610	act Thr	aca Thr	gaa Glu	ttg Leu	tca Ser 615	aaa Lys	ccg Pro	cca Pro	gaa Glu	atg Met 620	cag Gln	gaa Glu	caa Gln	att Ile	1872
att Ile 625	cag Gln	tac Tyr	tgc Cys	cac His	tgt Cys 630	ctg Leu	gca Ala	caa Gln	ttg Leu	aca Thr 635	atg Met	att Ile	tat Tyr	cgt Arg	tct Ser 640	1920
tcc Ser	ggc Gly	att Ile	aat Asn	gaa Glu 645	aac Asn	gct Ala	ttc Phe	cgt Arg	cta Leu 650	ttt Phe	atc Ile	gaa Glu	aag Lys	cca Pro 655	act Thr	1968
att Ile	ttt Phe	ggc Gly 660	atc Ile	cct Pro	gat Asp	gaa Glu	ccg Pro	aat Asn 665	aaa Lys	gcg Ala	aca Thr	cca Pro	gcc Ala 670	cat His	aat Asn	2016
gca Ala	cca Pro	aca Thr 675	tta Leu	atc Ile	atc Ile	cta Leu	acc Thr 680	cgc Arg	ttt Phe	gcc Ala	aat Asn	tgg Trp 685	gtt Val	aat Asn	tct Ser	2064
cta Leu 690	ggt Gly	gaa Glu	aaa Lys	gcc Ala	tcc Ser	cct Pro 695	att Ile	cta Leu	acg Thr	gct Ala	ttt Phe 700	gaa Glu	aat Asn	aaa Lys	acc Thr	2112
tta Leu 705	act Thr	gcg Ala	gaa Glu	aaa Lys	tta Leu 710	gct Ala	aac Asn	gcc Ala	atg Met	aat Asn 715	ctt Leu	gat Asp	gct Ala	aat Asn	tta Leu 720	2160
ctg Leu	gaa Glu	caa Gln	gcc Ala	agt Ser 725	att Ile	caa Gln	gca Ala	caa Gln	aat Asn 730	tat Tyr	aag Lys	cag Gln	gtt Val	act Thr 735	aaa Lys	2208
gaa Glu	aat Asn	aca Thr 740	ttc Phe	tcc Ser	aat Asn	tgg Trp	caa Gln	tcc Ser 745	atc Ile	gac Asp	att Ile	att Ile	ctg Leu 750	caa Gln	tgg Trp	2256
act Thr	aat Asn 755	ata Ile	gcc Ala	agt Ser	aat Asn	tta Leu	aat Asn 760	atc Ile	tcc Ser	cca Pro	caa Gln	ggt Gly 765	att Ile	tcc Ser	cct Pro	2304
cta Leu 770	ata Ile	gca Ala	ttg Leu	gat Asp	tat Tyr 775	ata Ile	aaa Lys	ccg Pro	gct Ala	caa Gln	aaa Lys 780	aca Thr	ccg Pro	act Thr	tat Tyr	2352
gcc Ala 785	caa Gln	tgg Trp	gaa Glu	aat Asn	gca Ala 790	gct Ala	ata Ile	gca Ala	tta Leu	act Thr 795	gcc Ala	ggg Gly	tta Leu	gac Asp	act Thr 800	2400
caa Leu	caa Leu	act Leu	cat Leu	act Leu	cta Leu	cac Leu	gta Leu	ttt Leu	ctg Leu	gac Leu	gaa Leu	tct Leu	cgc Leu	agt Leu	acc Leu	2448



Gln	Gln	Thr	His	Thr	Leu	His	Val	Phe	Leu	Asp	Glu	Ser	Arg	Ser	Thr		
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Ala	Leu	Ser	Asn	Tyr	Tyr	Ile	Gly	Lys	Val	Ala	Asn	Arg	Ala	Ala	Ser		
			820					825					830				
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Ile	Lys	Ser	Arg	Asp	Asp	Leu	Tyr	Gln	Tyr	Leu	Leu	Ile	Asp	Asn	Gln		
		835					840					845					
gtt	tcc	gct	gaa	ata	aaa	act	aca	cgt	att	gcc	gaa	gcc	att	gcc	agt		2592
Val	Ser	Ala	Glu	Ile	Lys	Thr	Thr	Arg	Ile	Ala	Glu	Ala	Ile	Ala	Ser		
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Ile	Gln	Leu	Tyr	Val	Asn	Arg	Ala	Leu	Glu	Asn	Ile	Glu	Ile	His	Ala		
					870					875					880		
gtt	tct	gat	gtt	att	acc	cgt	caa	ttt	ttt	atc	gat	tggt	gat	aaa	tat		2688
Val	Ser	Asp	Val	Ile	Thr	Arg	Gln	Phe	Phe	Ile	Asp	Trp	Asp	Lys	Tyr		
				885					890					895			
aat	aaa	cgt	tac	agt	act	tgg	gct	ggc	gtt	tca	caa	tta	gtt	tac	tat		2736
Asn	Lys	Arg	Tyr	Ser	Thr	Trp	Ala	Gly	Val	Ser	Gln	Leu	Val	Tyr	Tyr		
			900					905					910				
ccc	gaa	aat	tat	atc	gac	ccg	acg	atg	cgt	atc	gga	caa	acg	aaa	atg		2784
Pro	Glu	Asn	Tyr	Ile	Asp	Pro	Thr	Met	Arg	Ile	Gly	Gln	Thr	Lys	Met		
		915					920					925					
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Met	Asp	Thr	Leu	Leu	Gln	Ser	Val	Ser	Gln	Ser	Gln	Leu	Asn	Ala	Asp		
	930					935					940						
acg	gta	gaa	gat	gca	ttt	aaa	tct	tac	ctg	acc	tcg	ttt	gaa	caa	gtc		2880
Thr	Val	Glu	Asp	Ala	Phe	Lys	Ser	Tyr	Leu	Thr	Ser	Phe	Glu	Gln	Val		
	945				950				955						960		
gct	aat	ttg	gaa	gtc	att	agt	gct	tat	cat	gat	aac	gtt	aat	aat	gac		2928
Ala	Asn	Leu	Glu	Val	Ile	Ser	Ala	Tyr	His	Asp	Asn	Val	Asn	Asn	Asp		
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caa	gga	ctg	acc	tat	ttt	atc	ggg	aac	agc	aaa	aca	gaa	gtt	aat	caa		2976
Gln	Gly	Leu	Thr	Tyr	Phe	Ile	Gly	Asn	Ser	Lys	Thr	Glu	Val	Asn	Gln		
			980					985					990				
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Tyr	Tyr	Trp	Arg	Ser	Val	Asp	His	Ser	Lys	Phe	Asn	Asp	Gly	Lys	Phe		
		995					1000					1005					
gct	gct	aat	gcc	tgg	agt	gaa	tgg	cac	aaa	att	gac	tgc	gca	att			3069
Ala	Ala	Asn	Ala	Trp	Ser	Glu	Trp	His	Lys	Ile	Asp	Cys	Ala	Ile			
	1010					1015					1020						
aat	ccc	tac	caa	agc	acc	att	cgc	cca	gtt	atc	tat	aaa	tcc	cga			3114
Asn	Pro	Tyr	Gln	Ser	Thr	Ile	Arg	Pro	Val	Ile	Tyr	Lys	Ser	Arg			
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Leu	Tyr	Leu	Ile	Trp	Leu	Glu	Gln	Lys	Glu	Thr	Ala	Lys	Gln	Lys			
	1040					1045					1050						
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Glu	Asp	Asn	Lys	Val	Thr	Thr	Asp	Tyr	His	Tyr	Glu	Leu	Lys	Leu	
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Ala	His	Ile	Arg	Tyr	Asp	Gly	Thr	Trp	Asn	Val	Pro	Ile	Thr	Phe	
	1070					1075					1080				
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Asp	Val	Asp	Glu	Lys	Ile	Leu	Ala	Leu	Glu	Leu	Thr	Lys	Ser	Gln	
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Ala	Pro	Gly	Leu	Tyr	Cys	Ala	Gly	Tyr	Gln	Gly	Glu	Asp	Thr	Leu	
	1100					1105					1110				
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Leu	Ile	Met	Phe	Tyr	Arg	Lys	Lys	Glu	Lys	Leu	Asp	Asp	Tyr	Lys	
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Thr	Ala	Pro	Met	Gln	Gly	Phe	Tyr	Ile	Phe	Ser	Asp	Met	Ser	Ser	
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Lys	Asp	Met	Thr	Asn	Glu	Gln	Cys	Asn	Ser	Tyr	Arg	Asp	Asn	Gly	
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Tyr	Thr	His	Phe	Asp	Thr	Asn	Ser	Asp	Thr	Asn	Ser	Val	Ile	Arg	
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Ile	Asn	Asn	Arg	Tyr	Ala	Glu	Asp	Tyr	Glu	Ile	Pro	Ser	Leu	Ile	
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Asn	His	Ser	Asn	Ser	His	Asp	Trp	Gly	Glu	Tyr	Asn	Leu	Ser	Gln	
	1190					1195					1200				
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Val	Tyr	Gly	Gly	Asn	Ile	Val	Ile	Asn	Tyr	Lys	Val	Thr	Ser	Asn	
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	1220					1225					1230				
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Gly	Lys	Glu	Gly	Arg	Glu	Arg	Ile	Gln	Ser	Asn	Leu	Ile	Lys	Lys	
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Tyr	Gly	Lys	Leu	Gly	Asp	Lys	Phe	Ile	Ile	Tyr	Thr	Ser	Leu	Gly	
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Ile	Asn	Pro	Asn	Asn	Ser	Ser	Asn	Arg	Phe	Met	Phe	Tyr	Pro	Val	
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Tyr	Gln	Tyr	Asn	Gly	Asn	Thr	Ser	Gly	Leu	Ala	Gln	Gly	Arg	Leu	
	1280					1285					1290				
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Leu	Phe	His	Arg	Asp	Thr	Ser	Tyr	Ser	Ser	Lys	Val	Ala	Ala	Trp	
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Lys	Gln	Tyr	Ile	Tyr	Met	Thr	Asp	Ser	Lys	Gly	Thr	Ala	Thr	Asp	
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Asn	Lys	Asp	Val	Ser	Val	Gln	Pro	Ser	Pro	Ser	Phe	Glu	Glu	Met	
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Cys	Tyr	Gln	Phe	Asn	Ala	Leu	Glu	Ile	Asp	Gly	Ser	Asn	Leu	Asn	
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Phe	Thr	Asn	Asn	Ser	Ala	Ser	Ile	Asp	Val	Thr	Phe	Thr	Ala	Leu	
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Asp	Glu	Asn	Gly	Ala	Gln	Tyr	Met	Gln	Trp	Gly	Ala	Tyr	Arg	Ile	
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Arg	Leu	Asn	Thr	Leu	Phe	Ala	Arg	Gln	Leu	Val	Glu	Arg	Ala	Asn	
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Gln	Gly	Ala	Leu	Ser	Asp	Ile	Thr	Gln	Thr	Thr	Val	Lys	Leu	Phe	
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Arg	Asp	Thr	Leu	Asn	Glu	Ala	Lys	Met	Trp	Tyr	Met	Gln	Ala	Leu	
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Ala	His	Ala	Tyr	Ala	Ile	Thr	Ser	Leu	Arg	Gln	Gly	Thr	Gln	Thr	
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Pro	Ala	Leu	Leu	Leu	Arg	Ser	Ala	Asn	Thr	Leu	Thr	Asp	Leu	Phe	
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Glu	Leu	Arg	Leu	Tyr	Asn	Leu	Arg	His	Asn	Leu	Ser	Ile	Asp	Gly	
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Ala	Leu	Leu	Ser	Ala	Ala	Val	Ala	Thr	Ser	Gln	Gly	Gly	Gly	Lys	
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Leu	Pro	Glu	Ser	Phe	Ile	Ser	Leu	Trp	Arg	Phe	Pro	His	Met	Leu	
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Thr	Leu	Gln	Asn	Ile	Ile	Glu	Arg	Gln	Asp	Ala	Glu	Ser	Leu	Asn	
	1910					1915					1920				
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Ala	Leu	Leu	Gln	Asn	Gln	Ala	Lys	Glu	Leu	Ile	Leu	Thr	Thr	Leu	
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Ser	Ile	Gln	Asp	Lys	Thr	Ile	Glu	Glu	Ile	Asp	Ala	Glu	Lys	Thr	
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Tyr	Ser	Lys	Leu	Tyr	Asp	Glu	Asp	Val	Asn	Ala	Gly	Glu	Arg	Gln	
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Ala	Leu	Asp	Met	Arg	Ile	Ala	Ser	Gln	Ser	Ile	Thr	Ser	Gly	Leu	
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Lys	Gly	Leu	His	Met	Ala	Ala	Ala	Ala	Leu	Glu	Met	Val	Pro	Asn	
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Ile	Glu	Ala	Glu	Lys	Val	Ser	Gln	Ser	Glu	Ile	Trp	Arg	Arg	Arg			
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Arg	Gln	Glu	Trp	Glu	Ile	Gln	Arg	Asn	Asn	Ala	Glu	Ala	Glu	Met			
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Lys	Gln	Ile	Asp	Ala	Gln	Leu	Lys	Ser	Leu	Thr	Val	Arg	Arg	Glu			
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Thr	Gln	Ala	Gln	Leu	Ala	Phe	Leu	Gln	Arg	Lys	Phe	Ser	Asn	Gln			
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Gln	Phe	Tyr	Asp	Leu	Val	Val	Ala	Arg	Cys	Leu	Met	Ala	Glu	Gln			
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Pro	Gly	Ala	Trp	Gln	Gly	Thr	Tyr	Ala	Gly	Leu	Leu	Ala	Gly	Glu			
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Thr	Leu	Met	Leu	Asn	Leu	Ala	Gln	Met	Glu	Asp	Ala	His	Leu	Lys			
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Thr	Leu	Thr	Leu	Gln	Asp	Leu	Lys	Leu	Lys	Asp	Asp	Tyr	Pro	Glu			
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Leu	Ser	Tyr	Gly	Gly	Asp	Ala	Thr	Gly	Leu	Ala	Lys	Gly	Cys	Lys			
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Leu	Asp	Phe	Asn	Asp	Gly	Lys	Phe	Leu	Pro	Phe	Glu	Gly	Ile	Asp			
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<211> 2381

<212> PRT

<213> Photorhabdus luminescens

<400> 8

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Arg	Gln	Gln	Val	Ser	Asp	His	Leu	Ser	Trp	Ser	Glu	Thr	Asn	Arg	Leu		
		35					40					45					
Tyr	Arg	Asp	Ala	Gln	Gln	Glu	Gln	Lys	Glu	Asn	Gln	Leu	Tyr	Glu	Ala		
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Arg	Ile	Leu	Lys	Arg	Ala	Asn	Pro	Gln	Leu	Gln	Asn	Ala	Val	His	Leu		
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Gly	Gly	Arg	Ala	Ser	Gln	Tyr	Val	Ala	Pro	Gly	Ser	Val	Ser	Ser	Met		

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Phe	Ser	Pro	Ala	Ala	Tyr	Leu	Thr	Glu	Leu	Tyr	Arg	Glu	Ala	Arg	Asn
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Leu	His	Ala	Ser	Asp	Ser	Val	Tyr	His	Leu	Asp	Glu	Arg	Arg	Pro	Asp
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Leu	Gln	Ser	Met	Thr	Leu	Ser	Gln	Gln	Asn	Met	Asp	Thr	Glu	Leu	Ser
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Thr	Leu	Ser	Leu	Ser	Asn	Glu	Ile	Leu	Leu	Lys	Gly	Ile	Lys	Ala	Asn
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Gln	Ser	Asn	Leu	Asp	Ser	Asp	Thr	Lys	Val	Met	Glu	Met	Leu	Ser	Thr
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Arg	Lys	Ala	Ile	Gln	Leu	Gln	Asp	Pro	Lys	Leu	Glu	Gln	Phe	Gln	Lys
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Ser	Pro	Ala	Val	Ala	Gly	Leu	Met	His	Gln	Ala	Ser	Leu	Leu	Gly	Ile
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Asn	Asn	Ser	Ile	Ser	Pro	Glu	Leu	Phe	Asn	Ile	Leu	Thr	Glu	Glu	Ile
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Thr	Glu	Ala	Asn	Ala	Glu	Ala	Ile	Tyr	Lys	Gln	Asn	Phe	Gly	Asp	Ile
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Asp	Pro	Ala	Cys	Leu	Ala	Met	Pro	Glu	Tyr	Leu	Lys	Ser	Tyr	Tyr	Asn
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Phe	Ser	Asp	Glu	Glu	Leu	Ser	Gln	Phe	Ile	Arg	Lys	Tyr	Pro	Asp	Asn
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Leu	Leu	Ser	Gln	Ala	Val	Asn	Leu	Pro	Phe	Leu	Lys	Leu	Asp	Glu	Ile
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Ser	Gln	Phe	Asp	Arg	Leu	Phe	Asn	Thr	Ser	Pro	Leu	Asn	Gly	Gln	Tyr
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Phe	Val	Ile	Glu	Asp	Thr	Asn	Ile	Asp	Leu	Ser	Leu	Asn	Ser	Thr	Asp
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Asn	Trp	His	Lys	Ala	Val	Leu	Lys	Arg	Ala	Phe	Asn	Val	Asp	Asp	Ile
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Ser	Leu	Tyr	Arg	Leu	Leu	His	Ile	Ala	Asn	His	Asn	Asn	Thr	Asp	Gly
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Lys Ile Ala Asn Asn Ile Lys Asn Leu Ser Asn Leu Tyr Met Thr Lys  
 450 455 460  
 Leu Leu Ala Asp Ile His Gln Leu Thr Ile Asp Glu Leu Tyr Leu Leu  
 465 470 475 480  
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 485 490 495  
 Lys Glu Leu Glu Lys Leu Ile Asn Arg Leu Asp Thr Leu Ser Asn Trp  
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 Leu His Thr Gln Lys Trp Ser Ile Tyr Gln Leu Phe Leu Met Thr Thr  
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 Glu Asn Val Ala His Ser Ile Leu Leu Trp Ala Asp Lys Ile Lys Pro  
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 Ser Glu Asn Lys Ile Thr Ala Glu Lys Phe Trp Ile Trp Leu Gln Asn  
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 Arg Asp Thr Thr Glu Leu Ser Lys Pro Pro Glu Met Gln Glu Gln Ile  
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 Ile Gln Tyr Cys His Cys Leu Ala Gln Leu Thr Met Ile Tyr Arg Ser  
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 Ser Gly Ile Asn Glu Asn Ala Phe Arg Leu Phe Ile Glu Lys Pro Thr  
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 Ala His Ile Arg Tyr Asp Gly Thr Trp Asn Val Pro Ile Thr Phe  
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 Leu Ile Met Phe Tyr Arg Lys Lys Glu Lys Leu Asp Asp Tyr Lys

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Cys	Tyr	Gln	Phe	Asn	Ala	Leu	Glu	Ile	Asp	Gly	Ser	Asn	Leu	Asn
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Lys	Tyr	Asn	Pro	Asp	Ile	His	Gly	Thr	Asn	Lys	Ser	Phe	Lys	Ile
1520						1525					1530			
Ile	Tyr	Gly	Asp	Ile	Phe	Lys	Ala	Gly	Asp	His	Phe	Pro	Ile	Tyr
1535						1540					1545			
Gln	Gly	Ala	Leu	Ser	Asp	Ile	Thr	Gln	Thr	Thr	Val	Lys	Leu	Phe
1550						1555					1560			
Leu	Pro	Arg	Val	Asp	Asn	Ala	Tyr	Gly	Asn	Lys	Asn	Asn	Leu	Tyr
1565						1570					1575			
Val	Tyr	Ala	Ala	Tyr	Gln	Lys	Val	Glu	Thr	Asn	Phe	Ile	Arg	Phe
1580						1585					1590			
Val	Lys	Glu	Asp	Asn	Asn	Lys	Pro	Ala	Thr	Phe	Asp	Thr	Thr	Tyr
1595						1600					1605			
Lys	Asn	Gly	Thr	Phe	Pro	Gly	Leu	Ala	Ser	Ala	Arg	Val	Ile	Gln
1610						1615					1620			
Thr	Val	Ser	Glu	Pro	Met	Asp	Phe	Ser	Gly	Ala	Asn	Ser	Leu	Tyr
1625						1630					1635			
Phe	Trp	Glu	Leu	Phe	Tyr	Tyr	Thr	Pro	Met	Met	Val	Ala	Gln	Arg
1640						1645					1650			
Leu	Leu	His	Glu	Gln	Asn	Phe	Asp	Glu	Ala	Asn	Arg	Trp	Leu	Lys
1655						1660					1665			
Tyr	Val	Trp	Ser	Pro	Ser	Gly	Tyr	Ile	Val	Arg	Gly	Gln	Ile	Lys
1670						1675					1680			
Asn	Tyr	His	Trp	Asn	Val	Arg	Pro	Leu	Leu	Glu	Asn	Thr	Ser	Trp
1685						1690					1695			
Asn	Ser	Asp	Pro	Leu	Asp	Ser	Val	Asp	Pro	Asp	Ala	Val	Ala	Gln
1700						1705					1710			
His	Asp	Pro	Met	His	Tyr	Lys	Val	Ala	Thr	Phe	Met	Arg	Thr	Leu
1715						1720					1725			
Asp	Leu	Leu	Met	Ala	Arg	Gly	Asp	His	Ala	Tyr	Arg	Gln	Leu	Glu
1730						1735					1740			
Arg	Asp	Thr	Leu	Asn	Glu	Ala	Lys	Met	Trp	Tyr	Met	Gln	Ala	Leu
1745						1750					1755			

His	Leu	Leu	Gly	Asn	Lys	Pro	Tyr	Leu	Pro	Leu	Ser	Ser	Val	Trp
	1760					1765					1770			
Asn	Asp	Pro	Arg	Leu	Asp	Asn	Ala	Ala	Ala	Thr	Thr	Thr	Gln	Lys
	1775					1780					1785			
Ala	His	Ala	Tyr	Ala	Ile	Thr	Ser	Leu	Arg	Gln	Gly	Thr	Gln	Thr
	1790					1795					1800			
Pro	Ala	Leu	Leu	Leu	Arg	Ser	Ala	Asn	Thr	Leu	Thr	Asp	Leu	Phe
	1805					1810					1815			
Leu	Pro	Gln	Ile	Asn	Asp	Val	Met	Leu	Ser	Tyr	Trp	Asn	Lys	Leu
	1820					1825					1830			
Glu	Leu	Arg	Leu	Tyr	Asn	Leu	Arg	His	Asn	Leu	Ser	Ile	Asp	Gly
	1835					1840					1845			
Gln	Pro	Leu	His	Leu	Pro	Ile	Tyr	Ala	Thr	Pro	Ala	Asp	Pro	Lys
	1850					1855					1860			
Ala	Leu	Leu	Ser	Ala	Ala	Val	Ala	Thr	Ser	Gln	Gly	Gly	Gly	Lys
	1865					1870					1875			
Leu	Pro	Glu	Ser	Phe	Ile	Ser	Leu	Trp	Arg	Phe	Pro	His	Met	Leu
	1880					1885					1890			
Glu	Asn	Ala	Arg	Ser	Met	Val	Thr	Gln	Leu	Ile	Gln	Phe	Gly	Ser
	1895					1900					1905			
Thr	Leu	Gln	Asn	Ile	Ile	Glu	Arg	Gln	Asp	Ala	Glu	Ser	Leu	Asn
	1910					1915					1920			
Ala	Leu	Leu	Gln	Asn	Gln	Ala	Lys	Glu	Leu	Ile	Leu	Thr	Thr	Leu
	1925					1930					1935			
Ser	Ile	Gln	Asp	Lys	Thr	Ile	Glu	Glu	Ile	Asp	Ala	Glu	Lys	Thr
	1940					1945					1950			
Val	Leu	Glu	Lys	Ser	Lys	Ala	Gly	Ala	Lys	Ser	Arg	Phe	Asp	Asn
	1955					1960					1965			
Tyr	Ser	Lys	Leu	Tyr	Asp	Glu	Asp	Val	Asn	Ala	Gly	Glu	Arg	Gln
	1970					1975					1980			
Ala	Leu	Asp	Met	Arg	Ile	Ala	Ser	Gln	Ser	Ile	Thr	Ser	Gly	Leu
	1985					1990					1995			
Lys	Gly	Leu	His	Met	Ala	Ala	Ala	Ala	Leu	Glu	Met	Val	Pro	Asn
	2000					2005					2010			
Ile	Tyr	Gly	Phe	Ala	Val	Gly	Gly	Thr	Arg	Tyr	Gly	Ala	Ile	Ala
	2015					2020					2025			
Asn	Ala	Ile	Ala	Ile	Gly	Gly	Gly	Ile	Ala	Ala	Glu	Gly	Leu	Leu
	2030					2035					2040			
Ile	Glu	Ala	Glu	Lys	Val	Ser	Gln	Ser	Glu	Ile	Trp	Arg	Arg	Arg
	2045					2050					2055			
Arg	Gln	Glu	Trp	Glu	Ile	Gln	Arg	Asn	Asn	Ala	Glu	Ala	Glu	Met
	2060					2065					2070			
Lys	Gln	Ile	Asp	Ala	Gln	Leu	Lys	Ser	Leu	Thr	Val	Arg	Arg	Glu

2075						2080				2085				
Ala	Ala	Val	Leu	Gln	Lys	Thr	Gly	Leu	Lys	Thr	Gln	Gln	Glu	Gln
2090						2095					2100			
Thr	Gln	Ala	Gln	Leu	Ala	Phe	Leu	Gln	Arg	Lys	Phe	Ser	Asn	Gln
2105						2110					2115			
Ala	Leu	Tyr	Asn	Trp	Leu	Arg	Gly	Arg	Leu	Ala	Ala	Ile	Tyr	Phe
2120						2125					2130			
Gln	Phe	Tyr	Asp	Leu	Val	Val	Ala	Arg	Cys	Leu	Met	Ala	Glu	Gln
2135						2140					2145			
Ala	Tyr	Arg	Trp	Glu	Thr	Asn	Asp	Ser	Ser	Ala	Arg	Phe	Ile	Lys
2150						2155					2160			
Pro	Gly	Ala	Trp	Gln	Gly	Thr	Tyr	Ala	Gly	Leu	Leu	Ala	Gly	Glu
2165						2170					2175			
Thr	Leu	Met	Leu	Asn	Leu	Ala	Gln	Met	Glu	Asp	Ala	His	Leu	Lys
2180						2185					2190			
Gln	Glu	Gln	Arg	Ala	Leu	Glu	Val	Glu	Arg	Thr	Val	Ser	Leu	Ala
2195						2200					2205			
Gln	Val	Tyr	Gln	Ser	Leu	Gly	Glu	Lys	Ser	Phe	Ala	Leu	Lys	Asp
2210						2215					2220			
Lys	Ile	Glu	Ala	Leu	Leu	Gln	Gly	Asp	Lys	Glu	Thr	Ser	Ala	Gly
2225						2230					2235			
Asn	Asp	Gly	Asn	Gln	Leu	Lys	Leu	Thr	Asn	Asn	Thr	Leu	Ser	Ala
2240						2245					2250			
Thr	Leu	Thr	Leu	Gln	Asp	Leu	Lys	Leu	Lys	Asp	Asp	Tyr	Pro	Glu
2255						2260					2265			
Glu	Met	Gln	Leu	Gly	Lys	Thr	Arg	Arg	Ile	Lys	Gln	Ile	Ser	Val
2270						2275					2280			
Ser	Leu	Pro	Ala	Leu	Leu	Gly	Pro	Tyr	Gln	Asp	Val	Gln	Ala	Val
2285						2290					2295			
Leu	Ser	Tyr	Gly	Gly	Asp	Ala	Thr	Gly	Leu	Ala	Lys	Gly	Cys	Lys
2300						2305					2310			
Ala	Leu	Ala	Val	Ser	His	Gly	Leu	Asn	Asp	Asn	Gly	Gln	Phe	Gln
2315						2320					2325			
Leu	Asp	Phe	Asn	Asp	Gly	Lys	Phe	Leu	Pro	Phe	Glu	Gly	Ile	Asp
2330						2335					2340			
Ile	Asn	Asp	Lys	Gly	Thr	Phe	Thr	Leu	Ser	Phe	Pro	Asn	Ala	Ala
2345						2350					2355			
Ser	Lys	Gln	Lys	Asn	Ile	Leu	Gln	Met	Leu	Thr	Asp	Ile	Ile	Leu
2360						2365					2370			
His	Ile	Arg	Tyr	Thr	Ile	Leu	Glu							
2375						2380								

&lt;210&gt; 9

&lt;211&gt; 4425

&lt;212&gt; DNA

&lt;213&gt; Photorhabdus luminescens

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(4422)

&lt;400&gt; 9

atg	caa	aat	tca	caa	gat	ttt	agt	att	acg	gaa	ctg	tca	ctg	ccc	aaa	48
Met	Gln	Asn	Ser	Gln	Asp	Phe	Ser	Ile	Thr	Glu	Leu	Ser	Leu	Pro	Lys	
1				5					10					15		

ggg	ggg	ggc	gct	atc	acg	gga	atg	ggg	gaa	gca	tta	acc	ccc	act	gga	96
Gly	Gly	Gly	Ala	Ile	Thr	Gly	Met	Gly	Glu	Ala	Leu	Thr	Pro	Thr	Gly	
			20					25					30			

ccg	gat	ggg	atg	gcc	gcg	cta	tct	cta	cca	ttg	cct	att	tct	gcc	ggg	144
Pro	Asp	Gly	Met	Ala	Ala	Leu	Ser	Leu	Pro	Leu	Pro	Ile	Ser	Ala	Gly	
		35					40					45				

cgc	ggg	tat	gct	ccc	gca	ttc	act	ctg	aat	tac	aac	agc	ggc	gcc	ggg	192
Arg	Gly	Tyr	Ala	Pro	Ala	Phe	Thr	Leu	Asn	Tyr	Asn	Ser	Gly	Ala	Gly	
	50					55					60					

aac	agt	cca	ttt	ggg	ctg	ggg	tgg	gat	tgc	aac	gtt	atg	act	atc	cgc	240
Asn	Ser	Pro	Phe	Gly	Leu	Gly	Trp	Asp	Cys	Asn	Val	Met	Thr	Ile	Arg	
65					70				75						80	

cgc	cgc	acc	cat	ttt	ggc	gtc	ccc	cat	tat	gac	gaa	acc	gat	acc	ttt	288
Arg	Arg	Thr	His	Phe	Gly	Val	Pro	His	Tyr	Asp	Glu	Thr	Asp	Thr	Phe	
			85						90					95		

ttg	ggg	cca	gaa	ggc	gaa	gtg	ctg	gtg	gta	gcg	gat	caa	cct	cgc	gac	336
Leu	Gly	Pro	Glu	Gly	Glu	Val	Leu	Val	Val	Ala	Asp	Gln	Pro	Arg	Asp	
			100					105					110			

gaa	tcc	aca	tta	cag	ggg	atc	aat	tta	ggc	gcc	acc	ttt	acc	gtt	acc	384
Glu	Ser	Thr	Leu	Gln	Gly	Ile	Asn	Leu	Gly	Ala	Thr	Phe	Thr	Val	Thr	
		115					120					125				

ggc	tac	cgt	tcc	cgt	ctg	gaa	agc	cat	ttc	agc	cga	ttg	gaa	tat	tgg	432
Gly	Tyr	Arg	Ser	Arg	Leu	Glu	Ser	His	Phe	Ser	Arg	Leu	Glu	Tyr	Trp	
	130					135					140					

caa	ccc	aaa	aca	aca	ggg	aaa	aca	gat	ttt	tgg	ttg	ata	tat	agc	cca	480
Gln	Pro	Lys	Thr	Thr	Gly	Lys	Thr	Asp	Phe	Trp	Leu	Ile	Tyr	Ser	Pro	
145					150					155					160	

gat	ggg	cag	gtg	cat	cta	ctg	ggg	aaa	tca	ccg	caa	gcg	cgg	atc	agc	528
Asp	Gly	Gln	Val	His	Leu	Leu	Gly	Lys	Ser	Pro	Gln	Ala	Arg	Ile	Ser	
				165					170					175		

aac	cca	tcc	caa	acg	aca	caa	aca	gca	caa	tgg	ctg	ctg	gaa	gcc	tct	576
Asn	Pro	Ser	Gln	Thr	Thr	Gln	Thr	Ala	Gln	Trp	Leu	Leu	Glu	Ala	Ser	
			180					185					190			

gta	tca	tca	cgt	ggc	gaa	caa	att	tat	tat	caa	tat	cgc	gcc	gaa	gat	624
Val	Ser	Ser	Arg	Gly	Glu	Gln	Ile	Tyr	Tyr	Gln	Tyr	Arg	Ala	Glu	Asp	
		195					200					205				

gac Asp 210	aca Thr	ggt Gly	tgc Cys	gaa Glu	gca Ala	gat Asp 215	gaa Glu	att Ile	acg Thr	cac His	cat His 220	tta Leu	cag Gln	gct Ala	aca Thr	672
gcg Ala 225	caa Gln	cgt Arg	tat Tyr	tta Leu	cac His 230	atc Ile	gtg Val	tat Tyr	tac Tyr	ggc Gly 235	aac Asn	cgt Arg	aca Thr	gcc Ala	agc Ser 240	720
gaa Glu	aca Thr	tta Leu	ccc Pro	ggt Gly 245	ctg Leu	gat Asp	ggc Gly	agc Ser	gcc Ala 250	cca Pro	tca Ser	caa Gln	gca Ala	gac Asp 255	tgg Trp	768
ttg Leu	ttc Phe	tat Tyr	ctg Leu 260	gta Val	ttt Phe	gat Asp	tac Tyr	ggc Gly 265	gaa Glu	cgc Arg	agt Ser	aac Asn 270	aac Asn	ctg Leu	aaa Lys	816
acg Thr	cca Pro	cca Pro	gca Ala	ttt Phe	tcg Ser	act Thr	aca Thr 280	ggt Gly	agc Ser	tgg Trp	ctt Leu	tgc Cys 285	cgt Arg	cag Gln	gac Asp	864
cgt Arg	ttt Phe	tcc Ser	cgt Arg	tat Tyr	gaa Glu	tat Tyr 295	ggc Gly	ttt Phe	gag Glu	att Ile	cgt Arg 300	acc Thr	cgc Arg	cgc Arg	tta Leu	912
tgc Cys 305	cgt Arg	cag Gln	gta Val	ttg Leu	atg Met 310	tac Tyr	cat His	cac His	ctg Leu	caa Gln 315	gca Ala	ctg Leu	gat Asp	agt Ser	aag Lys 320	960
ata Ile	aca Thr	gaa Glu	cac His	aac Asn 325	gga Gly	cca Pro	acg Thr	ctg Leu	gtt Val 330	tca Ser	cgc Arg	ctg Leu	ata Ile	ctc Leu 335	aat Asn	1008
tac Tyr	gac Asp	gaa Glu	agc Ser	gcg Ala	ata Ile	gcc Ala	agc Ser	acg Thr 345	cta Leu	gta Val	ttc Phe	gtt Val	cgc Arg 350	cga Arg	gtg Val	1056
gga Gly	cac His	gag Glu	caa Gln	gat Asp	ggt Gly	aat Asn 360	gtc Val	gtc Val	acc Thr	ctg Leu	ccg Pro	cca Pro 365	tta Leu	gaa Glu	ttg Leu	1104
gca Ala	tat Tyr 370	cag Gln	gat Asp	ttt Phe	tca Ser	ccg Pro 375	cga Arg	cat His	cac His	gct Ala	cac His 380	tgg Trp	caa Gln	cca Pro	atg Met	1152
gat Asp 385	gta Val	ctg Leu	gca Ala	aac Asn	ttc Phe 390	aat Asn	gcc Ala	att Ile	cag Gln	cgc Arg 395	tgg Trp	cag Gln	cta Leu	gtc Val	gat Asp 400	1200
cta Leu	aaa Lys	ggc Gly	gaa Glu	gga Gly 405	tta Leu	ccc Pro	ggc Gly	ctg Leu	tta Leu 410	tat Tyr	cag Gln	gat Asp	aaa Lys	ggc Gly 415	gct Ala	1248
tgg Trp	tgg Trp	tac Tyr	cgc Arg	tcc Ser	gca Ala	cag Gln	cgt Arg	ctg Leu 425	ggc Gly	gaa Glu	att Ile	ggc Gly	tca Ser 430	gat Asp	gcc Ala	1296
gtc Val	act Thr	tgg Trp	gaa Glu	aag Lys	atg Met	caa Gln	cct Pro 440	tta Leu	tcg Ser	gtt Val	att Ile	cct Pro 445	tct Ser	ttg Leu	caa Gln	1344
agt Ser	aat Asn 450	gcc Ala	tcg Ser	ttg Leu	gtg Val	gat Asp 455	atc Ile	aat Asn	gga Gly	gac Asp	ggc Gly 460	caa Gln	ctt Leu	gac Asp	tgg Trp	1392



gtt atc acc gga ccg gga tta cgg gga tat cat agt caa cgc ccg gat Val Ile Thr Gly Pro Gly Leu Arg Gly Tyr His Ser Gln Arg Pro Asp 465 470 475 480	1440
ggc agt tgg aca cgt ttt acc cca ctc aac gct ctg ccg gtg gaa tac Gly Ser Trp Thr Arg Phe Thr Pro Leu Asn Ala Leu Pro Val Glu Tyr 485 490 495	1488
acc cat cca cgc gcg caa ctc gca gat tta atg gga gcc ggg cta tcc Thr His Pro Arg Ala Gln Leu Ala Asp Leu Met Gly Ala Gly Leu Ser 500 505 510	1536
gat ttg gtg ctg atc ggc cct aag agc gtg cgt tta tat gcc aat acc Asp Leu Val Leu Ile Gly Pro Lys Ser Val Arg Leu Tyr Ala Asn Thr 515 520 525	1584
cgc gac ggc ttt gcc aaa gga aaa gat gtg gtg caa tcc ggt gat atc Arg Asp Gly Phe Ala Lys Gly Lys Asp Val Val Gln Ser Gly Asp Ile 530 535 540	1632
aca ctg ccg gtg ccg ggc gcc gat cca cgt aag ttg gtg gcg ttt agt Thr Leu Pro Val Pro Gly Ala Asp Pro Arg Lys Leu Val Ala Phe Ser 545 550 555 560	1680
gat gta ttg ggt tca ggt caa gcc cat ctg gtt gaa gta agc gcg act Asp Val Leu Gly Ser Gly Gln Ala His Leu Val Glu Val Ser Ala Thr 565 570 575	1728
aaa gtc acc tgc tgg cct aat ctg ggg cgc gga cgt ttt ggt caa ccc Lys Val Thr Cys Trp Pro Asn Leu Gly Arg Gly Arg Phe Gly Gln Pro 580 585 590	1776
att acc tta ccg gga ttc agc cag cca gca acc gag ttt aac ccg gct Ile Thr Leu Pro Gly Phe Ser Gln Pro Ala Thr Glu Phe Asn Pro Ala 595 600 605	1824
caa gtt tat ctg gcc gat ctg gat ggc agc ggt cca acg gat ctg att Gln Val Tyr Leu Ala Asp Leu Asp Gly Ser Gly Pro Thr Asp Leu Ile 610 615 620	1872
tat gtt cat aca aac cgt ctg gat atc ttc ctg aac aaa agt ggc aat Tyr Val His Thr Asn Arg Leu Asp Ile Phe Leu Asn Lys Ser Gly Asn 625 630 635 640	1920
ggc ttt gct gaa cca gtg aca tta cgc ttc ccg gaa ggt ctg cgt ttt Gly Phe Ala Glu Pro Val Thr Leu Arg Phe Pro Glu Gly Leu Arg Phe 645 650 655	1968
gat cat acc tgt cag tta caa atg gcc gat gta caa gga tta ggc gtc Asp His Thr Cys Gln Leu Gln Met Ala Asp Val Gln Gly Leu Gly Val 660 665 670	2016
gcc agc ctg ata ctg agc gtg ccg cat atg tct ccc cat cac tgg cgc Ala Ser Leu Ile Leu Ser Val Pro His Met Ser Pro His His Trp Arg 675 680 685	2064
tgc gat ctg acc aac atg aag ccg tgg tta ctc aat gaa atg aac aac Cys Asp Leu Thr Asn Met Lys Pro Trp Leu Leu Asn Glu Met Asn Asn 690 695 700	2112
aat atg ggg gtc cat cac acc ttg cgt tac cgc agt tcc tcc caa ttc Asn Met Gly Val His His Thr Leu Arg Tyr Arg Ser Ser Ser Gln Phe 705 710 715 720	2160

tgg	ctg	gat	gaa	aaa	gcc	gcg	gcg	ctg	act	acc	gga	caa	aca	ccg	gtt	2208
Trp	Leu	Asp	Glu	Lys	Ala	Ala	Ala	Leu	Thr	Thr	Gly	Gln	Thr	Pro	Val	
				725					730					735		
tgc	tat	ctc	ccc	ttc	ccg	atc	cac	acc	cta	tgg	caa	acg	gaa	aca	gaa	2256
Cys	Tyr	Leu	Pro	Phe	Pro	Ile	His	Thr	Leu	Trp	Gln	Thr	Glu	Thr	Glu	
			740					745					750			
gat	gaa	atc	agc	ggc	aac	aaa	tta	gtc	aca	aca	ctt	cgt	tat	gct	cgt	2304
Asp	Glu	Ile	Ser	Gly	Asn	Lys	Leu	Val	Thr	Thr	Leu	Arg	Tyr	Ala	Arg	
		755					760					765				
ggc	gca	tgg	gac	gga	cgc	gag	cgg	gaa	ttt	cgc	gga	ttt	ggg	tat	gta	2352
Gly	Ala	Trp	Asp	Gly	Arg	Glu	Arg	Glu	Phe	Arg	Gly	Phe	Gly	Tyr	Val	
	770					775					780					
gag	cag	aca	gac	agc	cat	caa	ctg	gct	caa	ggc	aac	gcg	cca	gaa	cgt	2400
Glu	Gln	Thr	Asp	Ser	His	Gln	Leu	Ala	Gln	Gly	Asn	Ala	Pro	Glu	Arg	
	785				790				795						800	
acg	cca	ccg	gcg	ctg	acc	aaa	aac	tgg	tat	gcc	acc	gga	ctg	ccg	gtg	2448
Thr	Pro	Pro	Ala	Leu	Thr	Lys	Asn	Trp	Tyr	Ala	Thr	Gly	Leu	Pro	Val	
			805						810					815		
ata	gat	aac	gca	tta	tca	acc	gag	tat	tgg	cgt	gat	gat	cag	gct	ttt	2496
Ile	Asp	Asn	Ala	Leu	Ser	Thr	Glu	Tyr	Trp	Arg	Asp	Asp	Gln	Ala	Phe	
			820				825						830			
gcc	ggg	ttc	tca	ccg	cgc	ttt	acg	act	tgg	caa	gat	aac	aaa	gat	gtc	2544
Ala	Gly	Phe	Ser	Pro	Arg	Phe	Thr	Thr	Trp	Gln	Asp	Asn	Lys	Asp	Val	
	835					840						845				
ccg	tta	aca	ccg	gaa	gat	gat	aac	agt	cgt	tac	tgg	ttc	aac	cgc	gcg	2592
Pro	Leu	Thr	Pro	Glu	Asp	Asp	Asn	Ser	Arg	Tyr	Trp	Phe	Asn	Arg	Ala	
	850				855						860					
ttg	aaa	ggg	caa	ctg	cta	cgt	agt	gaa	ctg	tac	gga	ttg	gac	gat	agt	2640
Leu	Lys	Gly	Gln	Leu	Leu	Arg	Ser	Glu	Leu	Tyr	Gly	Leu	Asp	Asp	Ser	
	865			870					875						880	
aca	aat	aaa	cac	gtt	ccc	tat	act	gtc	act	gaa	ttt	cgt	tca	cag	gta	2688
Thr	Asn	Lys	His	Val	Pro	Tyr	Thr	Val	Thr	Glu	Phe	Arg	Ser	Gln	Val	
			885					890						895		
cgt	cga	tta	cag	cat	acc	gac	agc	cga	tac	cct	gta	ctt	tgg	tca	tct	2736
Arg	Arg	Leu	Gln	His	Thr	Asp	Ser	Arg	Tyr	Pro	Val	Leu	Trp	Ser	Ser	
			900					905					910			
gta	gtt	gaa	agc	cgc	aac	tat	cac	tac	gaa	cgt	atc	gcc	agc	gac	ccg	2784
Val	Val	Glu	Ser	Arg	Asn	Tyr	His	Tyr	Glu	Arg	Ile	Ala	Ser	Asp	Pro	
		915					920					925				
caa	tgc	agt	caa	aat	att	acg	cta	tcc	agt	gat	cga	ttt	ggg	cag	ccg	2832
Gln	Cys	Ser	Gln	Asn	Ile	Thr	Leu	Ser	Ser	Asp	Arg	Phe	Gly	Gln	Pro	
	930					935					940					
cta	aaa	cag	ctt	tcg	gta	cag	tac	ccg	cgc	cgc	cag	cag	cca	gca	atc	2880
Leu	Lys	Gln	Leu	Ser	Val	Gln	Tyr	Pro	Arg	Arg	Gln	Gln	Pro	Ala	Ile	
	945				950					955					960	
aat	ctg	tat	cct	gat	aca	ttg	cct	gat	aag	ttg	tta	gcc	aac	agc	tat	2928
Asn	Leu	Tyr	Pro	Asp	Thr	Leu	Pro	Asp	Lys	Leu	Leu	Ala	Asn	Ser	Tyr	
				965					970					975		

gat gac caa caa cgc caa tta cgg ctc acc tat caa caa tcc agt tgg	2976
Asp Asp Gln Gln Arg Gln Leu Arg Leu Thr Tyr Gln Gln Ser Ser Trp	
980 985 990	
cat cac ctg acc aac aat acc gtt cga gta ttg gga tta ccg gat agt	3024
His His Leu Thr Asn Asn Thr Val Arg Val Leu Gly Leu Pro Asp Ser	
995 1000 1005	
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Thr Arg Ser Asp Ile Phe Thr Tyr Gly Ala Glu Asn Val Pro Ala	
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Gly Gly Leu Asn Leu Glu Leu Leu Ser Asp Lys Asn Ser Leu Ile	
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Tyr Thr Asp Gly Gln Asn Thr Thr Pro Leu Gln Thr Pro Thr Arg	
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Gln Ala Leu Ile Ala Phe Thr Glu Thr Thr Val Phe Asn Gln Ser	
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Pro Arg Thr Gly Glu Asp Lys Val Trp Val Ala His His Gly Tyr	
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Thr Ser Ala Lys Tyr Asp Trp Arg Phe Leu Thr Pro Val Gln Leu	
1175 1180 1185	
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tcc Ser 1235	gat Asp 1235	gtt Val 1235	aat Asn 1235	gcc Ala 1235	gct Ala 1240	att Ile 1240	gag Glu 1245	tta Leu 1245	aaa Lys 1245	aaa Lys 1245	ccg Pro 1245	ctc Leu 1245	cct Pro 1245	gta Val 1245	3744
gca Ala 1250	cag Gln 1250	tgt Cys 1250	cag Gln 1250	gtc Val 1250	tac Tyr 1255	gca Ala 1255	cca Pro 1255	gaa Glu 1260	agc Ser 1260	tgg Trp 1260	atg Met 1260	cca Pro 1260	gta Val 1260	tta Leu 1260	3789
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ctc Leu 1310	att Ile 1310	agc Ser 1310	ctg Leu 1310	tta Leu 1310	aac Asn 1315	aac Asn 1315	gga Gly 1315	ccc Pro 1315	cgt Arg 1315	tta Leu 1315	cct Pro 1320	cct Pro 1320	cac His 1320	agc Ser 1320	3969
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caa Gln 1355	gcc Ala 1355	gct Ala 1355	gcc Ala 1355	cga Arg 1355	cat His 1360	gag Glu 1360	gca Ala 1360	ggc Gly 1360	atg Met 1360	gcc Ala 1365	cgg Arg 1365	caa Gln 1365	cgc Arg 1365	aat Asn 1365	4104
gaa Glu 1370	gac Asp 1370	ggc Gly 1370	tct Ser 1370	ttg Leu 1370	att Ile 1375	ata Ile 1375	aat Asn 1375	gtc Val 1375	cag Gln 1375	cat His 1375	act Thr 1380	gag Glu 1380	aac Asn 1380	cgt Arg 1380	4149
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cat His 1430	gtc Val 1430	tat Tyr 1430	gat Asp 1430	ccc Pro 1430	ata Ile 1435	ggg Gly 1435	cga Arg 1435	gaa Glu 1435	atc Ile 1435	aag Lys 1435	gtt Val 1440	atc Ile 1440	acc Thr 1440	gca Ala 1440	4329
aaa Lys 1445	ggg Gly 1445	tgg Trp 1445	ttc Phe 1445	cgt Arg 1445	cga Arg 1450	acc Thr 1450	ttg Leu 1450	ttc Phe 1450	act Thr 1450	ccc Pro 1450	tgg Trp 1455	ttt Phe 1455	act Thr 1455	gtc Val 1455	4374

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atg taa 4425  
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<213> Photorhabdus luminescens

<400> 10

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Pro Asp Gly Met Ala Ala Leu Ser Leu Pro Leu Pro Ile Ser Ala Gly  
 35 40 45

Arg Gly Tyr Ala Pro Ala Phe Thr Leu Asn Tyr Asn Ser Gly Ala Gly  
 50 55 60

Asn Ser Pro Phe Gly Leu Gly Trp Asp Cys Asn Val Met Thr Ile Arg  
 65 70 75 80

Arg Arg Thr His Phe Gly Val Pro His Tyr Asp Glu Thr Asp Thr Phe  
 85 90 95

Leu Gly Pro Glu Gly Glu Val Leu Val Val Ala Asp Gln Pro Arg Asp  
 100 105 110

Glu Ser Thr Leu Gln Gly Ile Asn Leu Gly Ala Thr Phe Thr Val Thr  
 115 120 125

Gly Tyr Arg Ser Arg Leu Glu Ser His Phe Ser Arg Leu Glu Tyr Trp  
 130 135 140

Gln Pro Lys Thr Thr Gly Lys Thr Asp Phe Trp Leu Ile Tyr Ser Pro  
 145 150 155 160

Asp Gly Gln Val His Leu Leu Gly Lys Ser Pro Gln Ala Arg Ile Ser  
 165 170 175

Asn Pro Ser Gln Thr Thr Gln Thr Ala Gln Trp Leu Leu Glu Ala Ser  
 180 185 190

Val Ser Ser Arg Gly Glu Gln Ile Tyr Tyr Gln Tyr Arg Ala Glu Asp  
 195 200 205

Asp Thr Gly Cys Glu Ala Asp Glu Ile Thr His His Leu Gln Ala Thr  
 210 215 220

Ala Gln Arg Tyr Leu His Ile Val Tyr Tyr Gly Asn Arg Thr Ala Ser  
 225 230 235 240

Glu 241	Thr 242	Leu 243	Pro 244	Gly 245	Leu 246	Asp 247	Gly 248	Ser 249	Ala 250	Pro 251	Ser 252	Gln 253	Ala 254	Asp 255	Trp 256
Leu 261	Phe 262	Tyr 263	Leu 260	Val 264	Phe 265	Asp 266	Tyr 267	Gly 265	Glu 268	Arg 269	Ser 270	Asn 271	Asn 270	Leu 272	Lys 273
Thr 281	Pro 282	Pro 275	Ala 276	Phe 277	Ser 278	Thr 279	Thr 280	Gly 281	Ser 282	Trp 283	Leu 284	Cys 285	Arg 286	Gln 287	Asp 288
Arg 291	Phe 290	Ser 291	Arg 292	Tyr 293	Glu 294	Tyr 295	Gly 296	Phe 297	Glu 298	Ile 299	Arg 300	Thr 301	Arg 302	Arg 303	Leu 304
Cys 305	Arg 306	Gln 307	Val 308	Leu 309	Met 310	Tyr 311	His 312	His 313	Leu 314	Gln 315	Ala 316	Leu 317	Asp 318	Ser 319	Lys 320
Ile 321	Thr 322	Glu 323	His 324	Asn 325	Gly 326	Pro 327	Thr 328	Leu 329	Val 330	Ser 331	Arg 332	Leu 333	Ile 334	Leu 335	Asn 336
Tyr 341	Asp 342	Glu 343	Ser 340	Ala 344	Ile 345	Ala 346	Ser 347	Thr 345	Leu 348	Val 349	Phe 350	Val 351	Arg 350	Arg 352	Val 353
Gly 354	His 355	Glu 355	Gln 356	Asp 357	Gly 358	Asn 359	Val 360	Val 361	Thr 362	Leu 363	Pro 364	Pro 365	Leu 366	Glu 367	Leu 368
Ala 369	Tyr 370	Gln 371	Asp 372	Phe 373	Ser 374	Pro 375	Arg 376	His 377	His 378	Ala 379	His 380	Trp 381	Gln 382	Pro 383	Met 384
Asp 385	Val 386	Leu 387	Ala 388	Asn 389	Phe 390	Asn 391	Ala 392	Ile 393	Gln 394	Arg 395	Trp 396	Gln 397	Leu 398	Val 399	Asp 400
Leu 401	Lys 402	Gly 403	Glu 404	Gly 405	Leu 406	Pro 407	Gly 408	Leu 409	Leu 410	Tyr 411	Gln 412	Asp 413	Lys 414	Gly 415	Ala 416
Trp 417	Trp 418	Tyr 419	Arg 420	Ser 421	Ala 422	Gln 423	Arg 424	Leu 425	Gly 426	Glu 427	Ile 428	Gly 429	Ser 430	Asp 431	Ala 432
Val 433	Thr 434	Trp 435	Glu 436	Lys 437	Met 438	Gln 439	Pro 440	Leu 441	Ser 442	Val 443	Ile 444	Pro 445	Ser 446	Leu 447	Gln 448
Ser 449	Asn 450	Ala 451	Ser 452	Leu 453	Val 454	Asp 455	Ile 456	Asn 457	Gly 458	Asp 459	Gly 460	Gln 461	Leu 462	Asp 463	Trp 464
Val 465	Ile 466	Thr 467	Gly 468	Pro 469	Gly 470	Leu 471	Arg 472	Gly 473	Tyr 474	His 475	Ser 476	Gln 477	Arg 478	Pro 479	Asp 480
Gly 481	Ser 482	Trp 483	Thr 484	Arg 485	Phe 486	Thr 487	Pro 488	Leu 489	Asn 490	Ala 491	Leu 492	Pro 493	Val 494	Glu 495	Tyr 496
Thr 497	His 498	Pro 499	Arg 500	Ala 501	Gln 502	Leu 503	Ala 504	Asp 505	Leu 506	Met 507	Gly 508	Ala 509	Gly 510	Leu 511	Ser 512
Asp 513	Leu 514	Val 515	Leu 516	Ile 517	Gly 518	Pro 519	Lys 520	Ser 521	Val 522	Arg 523	Leu 524	Tyr 525	Ala 526	Asn 527	Thr 528
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Thr 545	Leu 546	Pro 547	Val 548	Pro 549	Gly 550	Ala 551	Asp 552	Pro 553	Arg 554	Lys 555	Leu 556	Val 557	Ala 558	Phe 559	Ser 560
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Lys 577	Val 578	Thr 579	Cys 580	Trp 581	Pro 582	Asn 583	Leu 584	Gly 585	Arg 586	Gly 587	Arg 588	Phe 589	Gly 590	Gln 591	Pro 592



Gln Cys Ser Gln Asn Ile Thr Leu Ser Ser Asp Arg Phe Gly Gln Pro  
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 Leu Lys Gln Leu Ser Val Gln Tyr Pro Arg Arg Gln Gln Pro Ala Ile  
 945 950 955 960  
 Asn Leu Tyr Pro Asp Thr Leu Pro Asp Lys Leu Leu Ala Asn Ser Tyr  
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 Asp Asp Gln Gln Arg Gln Leu Arg Leu Thr Tyr Gln Gln Ser Ser Trp  
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 His His Leu Thr Asn Asn Thr Val Arg Val Leu Gly Leu Pro Asp Ser  
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 Thr Arg Ser Asp Ile Phe Thr Tyr Gly Ala Glu Asn Val Pro Ala  
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 Gly Gly Leu Asn Leu Glu Leu Leu Ser Asp Lys Asn Ser Leu Ile  
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 Pro Arg Thr Gly Glu Asp Lys Val Trp Val Ala His His Gly Tyr  
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 Ser Asp Val Asn Ala Ala Ile Glu Leu Lys Lys Pro Leu Pro Val  
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Ala	Gln	Cys	Gln	Val	Tyr	Ala	Pro	Glu	Ser	Trp	Met	Pro	Val	Leu
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Ser	Gln	Lys	Thr	Phe	Asn	Arg	Leu	Ala	Glu	Gln	Asp	Trp	Gln	Lys
1265						1270					1275			
Leu	Tyr	Asn	Ala	Arg	Ile	Ile	Thr	Glu	Asp	Gly	Arg	Ile	Cys	Thr
1280						1285					1290			
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1295						1300					1305			
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1310						1315					1320			
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Ile	Arg	Gln	Gln	Val	Val	Phe	Ser	Asp	Gly	Phe	Gly	Arg	Leu	Leu
1340						1345					1350			
Gln	Ala	Ala	Ala	Arg	His	Glu	Ala	Gly	Met	Ala	Arg	Gln	Arg	Asn
1355						1360					1365			
Glu	Asp	Gly	Ser	Leu	Ile	Ile	Asn	Val	Gln	His	Thr	Glu	Asn	Arg
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Trp	Ala	Val	Thr	Gly	Arg	Thr	Glu	Tyr	Asp	Asn	Lys	Gly	Gln	Pro
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Lys	Gly	Trp	Phe	Arg	Arg	Thr	Leu	Phe	Thr	Pro	Trp	Phe	Thr	Val
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Met

&lt;210&gt; 11

&lt;211&gt; 2883

&lt;212&gt; DNA

&lt;213&gt; Photorhabdus luminescens

&lt;220&gt;

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&lt;222&gt; (1)..(2880)

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48

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gat Asp	att Ile 50	cac His	gga Gly	cac His	cta Leu	aat Asn 55	caa Gln	agc Ser	atc Ile	gat Asp	ccg Pro 60	cgc Arg	cta Leu	tat Tyr	gaa Glu	192
gcc Ala 65	aag Lys	caa Gln	acc Thr	aac Asn	aat Asn 70	acg Thr	atc Ile	aaa Lys	ccc Pro	aat Asn 75	ttt Phe	ctt Leu	tgg Trp	cag Gln	tat Tyr 80	240
gat Asp	ttg Leu	acc Thr	ggg Gly	aat Asn 85	ccc Pro	cta Leu	tgt Cys	aca Thr	gag Glu 90	agc Ser	att Ile	gat Asp	gca Ala	ggg Gly 95	cgc Arg	288
act Thr	gtc Val	acc Thr	ttg Leu 100	aat Asn	gat Asp	att Ile	gaa Glu	ggc Gly 105	cgt Arg	ccg Pro	cta Leu	cta Leu	acg Thr 110	gtg Val	act Thr	336
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cgt Arg 145	atc Ile	acc Thr	gaa Glu	cgc Arg	ctg Leu 150	att Ile	tgg Trp	gct Ala	ggc Gly	aat Asn 155	acc Thr	gaa Glu	gca Ala	gag Glu	aaa Lys 160	480
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ctg Leu 225	agc Ser	acc Thr	ttc Phe	gat Asp	gcc Ala 230	acc Thr	ggg Gly	gct Ala	tta Leu 235	ctg Leu	act Thr	cag Gln	acc Thr	gat Asp	gcg Ala 240	720
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Leu	Arg	Tyr	Glu	Tyr	Asp	Pro	Val	Gly	Asn	Val	Ile	Ser	Ile	Arg	Asn	
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cgc	gaa	atg	gcg	aat	ata	ggt	caa	caa	agt	cac	caa	ttt	ccc	tca	ccc	1152
Arg	Glu	Met	Ala	Asn	Ile	Gly	Gln	Gln	Ser	His	Gln	Phe	Pro	Ser	Pro	
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gct	cta	cct	tct	gat	aac	aac	acc	tat	acc	aac	tat	acc	cgt	act	tat	1200
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Thr	Tyr	Asp	Arg	Gly	Gly	Asn	Leu	Thr	Lys	Ile	Gln	His	Ser	Ser	Pro	
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gcg	acg	caa	aac	aac	tac	acc	acc	aat	atc	acg	gtt	tca	aat	cgc	agc	1296
Ala	Thr	Gln	Asn	Asn	Tyr	Thr	Thr	Asn	Ile	Thr	Val	Ser	Asn	Arg	Ser	
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Ala	Leu	Phe	Asp	Ala	Gly	Gly	His	Gln	Asn	Thr	Leu	Ile	Ser	Gly	Gln	
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aac	ctg	aac	tgg	aat	act	cgt	ggt	gaa	ctg	caa	caa	gta	aca	ctg	gtt	1440
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Lys	Arg	Asp	Lys	Gly	Ala	Asn	Asp	Asp	Arg	Glu	Trp	Tyr	Arg	Tyr	Ser	
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ggt	gac	gga	aga	agg	atg	tta	aaa	atc	aat	gaa	cag	cag	gcc	agc	aac	1536
Gly	Asp	Gly	Arg	Arg	Met	Leu	Lys	Ile	Asn	Glu	Gln	Gln	Ala	Ser	Asn	
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Asn	Ala	Gln	Thr	Gln	Arg	Val	Thr	Tyr	Leu	Pro	Asn	Leu	Glu	Leu	Arg	
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Ile	Ser	Glu	Glu	Glu	Tyr	Tyr	Pro	Tyr	Gly	Gly	Thr	Ala	Leu	Trp	Ala	
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Lys	Glu	Arg	Asp	Ala	Thr	Gly	Leu	Tyr	Tyr	Tyr	Gly	Tyr	Arg	Tyr	Tyr	
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Thr	Asn	Val	Ala	Ile	Asn	Ile	Arg	Pro	Pro	Val	Ala	Pro	Lys	Pro	Ser	
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Lys	Pro	Lys	Leu	Lys	Asp	Leu	Ser	Asn	Tyr	Ile	Lys	Tyr	Thr	Lys	Asp	
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Gln	Ser	Ser	Gly	Ala	Pro	Leu	His	Lys	Ile	Asp	Met	Asp	Leu	Tyr	Glu	
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Lys	Asn	Met	Val	Pro	Ser	Leu	Leu	Leu	Asp	Thr	Pro	Gln	Ile	Glu	Thr	
		915					920					925				
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Ser	Ser	Ile	Ile	Ala	Leu	Asn	His	Gly	Pro	Val	Asn	Asp	Ala	Glu	Ile	
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Ser	Phe	Leu	Thr	Thr	Ile	Pro	Leu	Lys	Asn	Val	Lys	Pro	His	Lys	Arg	
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Val	Tyr	Asp	Asn	Arg	Gly	Leu	Ile	Ile	Arg	Asn	Ile	Asp	Phe	His	Arg	
			20					25					30			

Thr Thr Ala Asn Gly Asp Pro Asp Thr Arg Ile Thr Arg His Gln Tyr  
 35 40 45  
 Asp Ile His Gly His Leu Asn Gln Ser Ile Asp Pro Arg Leu Tyr Glu  
 50 55 60  
 Ala Lys Gln Thr Asn Asn Thr Ile Lys Pro Asn Phe Leu Trp Gln Tyr  
 65 70 75 80  
 Asp Leu Thr Gly Asn Pro Leu Cys Thr Glu Ser Ile Asp Ala Gly Arg  
 85 90 95  
 Thr Val Thr Leu Asn Asp Ile Glu Gly Arg Pro Leu Leu Thr Val Thr  
 100 105 110  
 Ala Thr Gly Val Ile Gln Thr Arg Gln Tyr Glu Thr Ser Ser Leu Pro  
 115 120 125  
 Gly Arg Leu Leu Ser Val Ala Glu Gln Thr Pro Glu Glu Lys Thr Ser  
 130 135 140  
 Arg Ile Thr Glu Arg Leu Ile Trp Ala Gly Asn Thr Glu Ala Glu Lys  
 145 150 155 160  
 Asp His Asn Leu Ala Gly Gln Cys Val Arg His Tyr Asp Thr Ala Gly  
 165 170 175  
 Val Thr Arg Leu Glu Ser Leu Ser Leu Thr Gly Thr Val Leu Ser Gln  
 180 185 190  
 Ser Ser Gln Leu Leu Ile Asp Thr Gln Glu Ala Asn Trp Thr Gly Asp  
 195 200 205  
 Asn Glu Thr Val Trp Gln Asn Met Leu Ala Asp Asp Ile Tyr Thr Thr  
 210 215 220  
 Leu Ser Thr Phe Asp Ala Thr Gly Ala Leu Leu Thr Gln Thr Asp Ala  
 225 230 235 240  
 Lys Gly Asn Ile Gln Arg Leu Ala Tyr Asp Val Ala Gly Gln Leu Asn  
 245 250 255  
 Gly Ser Trp Leu Thr Leu Lys Gly Gln Thr Glu Gln Val Ile Ile Lys  
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 Ser Leu Thr Tyr Ser Ala Ala Gly Gln Lys Leu Arg Glu Glu His Gly  
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 Asn Asp Val Ile Thr Glu Tyr Ser Tyr Glu Pro Glu Thr Gln Arg Leu  
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 Ile Gly Ile Lys Thr Arg Arg Pro Ser Asp Thr Lys Val Leu Gln Asp  
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 Leu Arg Tyr Glu Tyr Asp Pro Val Gly Asn Val Ile Ser Ile Arg Asn  
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 Asp Ala Glu Ala Thr Arg Phe Trp His Asn Gln Lys Val Met Pro Glu  
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 Asn Thr Tyr Thr Tyr Asp Ser Leu Tyr Gln Leu Ile Ser Ala Thr Gly  
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Arg	Glu	Met	Ala	Asn	Ile	Gly	Gln	Gln	Ser	His	Gln	Phe	Pro	Ser	Pro	370	375	380	
Ala	Leu	Pro	Ser	Asp	Asn	Asn	Thr	Tyr	Thr	Asn	Tyr	Thr	Arg	Thr	Tyr	385	390	395	400
Thr	Tyr	Asp	Arg	Gly	Gly	Asn	Leu	Thr	Lys	Ile	Gln	His	Ser	Ser	Pro	405	410	415	
Ala	Thr	Gln	Asn	Asn	Tyr	Thr	Thr	Asn	Ile	Thr	Val	Ser	Asn	Arg	Ser	420	425	430	
Asn	Arg	Ala	Val	Leu	Ser	Thr	Leu	Thr	Glu	Asp	Pro	Ala	Gln	Val	Asp	435	440	445	
Ala	Leu	Phe	Asp	Ala	Gly	Gly	His	Gln	Asn	Thr	Leu	Ile	Ser	Gly	Gln	450	455	460	
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Lys	Arg	Asp	Lys	Gly	Ala	Asn	Asp	Asp	Arg	Glu	Trp	Tyr	Arg	Tyr	Ser	485	490	495	
Gly	Asp	Gly	Arg	Arg	Met	Leu	Lys	Ile	Asn	Glu	Gln	Gln	Ala	Ser	Asn	500	505	510	
Asn	Ala	Gln	Thr	Gln	Arg	Val	Thr	Tyr	Leu	Pro	Asn	Leu	Glu	Leu	Arg	515	520	525	
Leu	Thr	Gln	Asn	Ser	Thr	Ala	Thr	Thr	Glu	Asp	Leu	Gln	Val	Ile	Thr	530	535	540	
Val	Gly	Glu	Ala	Gly	Arg	Ala	Gln	Val	Arg	Val	Leu	His	Trp	Glu	Ser	545	550	555	560
Gly	Lys	Pro	Glu	Asp	Ile	Asp	Asn	Asn	Gln	Leu	Arg	Tyr	Ser	Tyr	Asp	565	570	575	
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Ile	Ser	Glu	Glu	Glu	Tyr	Tyr	Pro	Tyr	Gly	Gly	Thr	Ala	Leu	Trp	Ala	595	600	605	
Ala	Arg	Asn	Gln	Thr	Glu	Ala	Ser	Tyr	Lys	Thr	Ile	Arg	Tyr	Ser	Gly	610	615	620	
Lys	Glu	Arg	Asp	Ala	Thr	Gly	Leu	Tyr	Tyr	Tyr	Gly	Tyr	Arg	Tyr	Tyr	625	630	635	640
Gln	Pro	Trp	Ile	Gly	Arg	Trp	Leu	Ser	Ser	Asp	Pro	Ala	Gly	Thr	Ile	645	650	655	
Asp	Gly	Leu	Asn	Leu	Tyr	Arg	Met	Val	Arg	Asn	Asn	Pro	Val	Thr	Leu	660	665	670	
Leu	Asp	Pro	Asp	Gly	Leu	Met	Pro	Thr	Ile	Ala	Glu	Arg	Ile	Ala	Ala	675	680	685	
Leu	Lys	Lys	Asn	Lys	Val	Thr	Asp	Ser	Ala	Pro	Ser	Pro	Ala	Asn	Ala	690	695	700	
Thr	Asn	Val	Ala	Ile	Asn	Ile	Arg	Pro	Pro	Val	Ala	Pro	Lys	Pro	Ser				

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Ser	Ala	Gln	Ser	Ser	Ser	Ser	Ser	Thr	Thr	Ser	Thr	Asn	Leu	Gln	Lys
	770					775					780				
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Gln	Ser	Ser	Gly	Ala	Pro	Leu	His	Lys	Ile	Asp	Met	Asp	Leu	Tyr	Glu
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Phe	Ala	Ile	Asp	Gly	Gln	Lys	Leu	Asn	Pro	Leu	Pro	Glu	Gly	Arg	Thr
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&lt;211&gt; 2850

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&lt;213&gt; Photorhabdus luminescens

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gac gtc gcg gga ggc gat aca gat act cgt att acc cgc cac caa tat Asp Val Ala Gly Gly Asp Thr Asp Thr Arg Ile Thr Arg His Gln Tyr 35 40 45				144
gat acc cga gga cac ttg agc caa agc att gat cca cgg ctg tat gac Asp Thr Arg Gly His Leu Ser Gln Ser Ile Asp Pro Arg Leu Tyr Asp 50 55 60				192
gcc aaa caa acc aat aac tcg aca aac ccc aac ttc ctc tgg caa tac Ala Lys Gln Thr Asn Asn Ser Thr Asn Pro Asn Phe Leu Trp Gln Tyr 65 70 75 80				240
aat ctc acc ggc gac act ttg cgg aca gaa agt gtc gat gcc ggc cgt Asn Leu Thr Gly Asp Thr Leu Arg Thr Glu Ser Val Asp Ala Gly Arg 85 90 95				288
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gca acc ggc gcc att cag acc cga caa tat gaa gcc aat acc ctg ccc Ala Thr Gly Ala Ile Gln Thr Arg Gln Tyr Glu Ala Asn Thr Leu Pro 115 120 125				384
ggt cgt cta tta tcc gta agt gaa caa gcc ccc gga gaa cag act ccc Gly Arg Leu Leu Ser Val Ser Glu Gln Ala Pro Gly Glu Gln Thr Pro 130 135 140				432
cgc gtt act gag cat ttt att tgg gct ggt aat aca cag gcg gag aaa Arg Val Thr Glu His Phe Ile Trp Ala Gly Asn Thr Gln Ala Glu Lys 145 150 155 160				480
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260				265				270								
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Asn	Gly	Val	Ile	Thr	Glu	Tyr	Ser	Tyr	Glu	Pro	Glu	Thr	Leu	Arg	Leu	
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Ser	Pro	Ala	Ala	Gln	Asn	Asn	Tyr	Thr	Thr	Asp	Ile	Thr	Val	Ser	Asn	
			420					425					430			
cgc	agt	aac	cgg	gca	gtg	ctg	agt	tcg	cta	acc	tca	gac	cca	aca	cag	1344
Arg	Ser	Asn	Arg	Ala	Val	Leu	Ser	Ser	Leu	Thr	Ser	Asp	Pro	Thr	Gln	
		435				440						445				
gtg	gag	gca	ctg	ttt	gat	gcc	ggc	gga	cat	caa	aca	aaa	ttg	tta	ccg	1392
Val	Glu	Ala	Leu	Phe	Asp	Ala	Gly	Gly	His	Gln	Thr	Lys	Leu	Leu	Pro	
	450					455					460					
ggg	caa	gag	ctg	agt	tgg	aat	aca	cga	ggc	gaa	cta	aaa	cag	gta	acg	1440
Gly	Gln	Glu	Leu	Ser	Trp	Asn	Thr	Arg	Gly	Glu	Leu	Lys	Gln	Val	Thr	
465					470					475					480	
cca	gtc	agt	cgc	gag	agc	gcc	agc	gat	cgg	gaa	tgg	tat	cgt	tac	ggc	1488
Pro	Val	Ser	Arg	Glu	Ser	Ala	Ser	Asp	Arg	Glu	Trp	Tyr	Arg	Tyr	Gly	
				485				490					495			
aac	gac	ggc	atg	cga	cgg	tta	aaa	gtc	agt	gag	caa	cag	act	ggc	aac	1536
Asn	Asp	Gly	Met	Arg	Arg	Leu	Lys	Val	Ser	Glu	Gln	Gln	Thr	Gly	Asn	
			500					505					510			
agc	acg	cag	cag	caa	cga	gta	act	tat	ctt	ccc	gat	ctg	gag	cta	cgt	1584
Ser	Thr	Gln	Gln	Gln	Arg	Val	Thr	Tyr	Leu	Pro	Asp	Leu	Glu	Leu	Arg	

515					520					525										
aca	aca	caa	aat	ggg	act	act	aca	tca	gaa	gac	ctg	cat	gct	att	acc	1632				
Thr	Thr	Gln	Asn	Gly	Thr	Thr	Thr	Ser	Glu	Asp	Leu	His	Ala	Ile	Thr					
	530					535					540									
gtg	gga	gca	gca	ggc	cac	gca	caa	gtg	cga	gtt	cta	cac	tgg	gaa	act	1680				
Val	Gly	Ala	Ala	Gly	His	Ala	Gln	Val	Arg	Val	Leu	His	Trp	Glu	Thr					
	545				550					555					560					
acg	cca	cca	gcc	ggg	atc	aat	aac	aat	cag	ctt	cgc	tat	agc	tat	gat	1728				
Thr	Pro	Pro	Ala	Gly	Ile	Asn	Asn	Asn	Gln	Leu	Arg	Tyr	Ser	Tyr	Asp					
				565					570					575						
aat	ttg	att	ggg	tcc	agt	caa	ctt	gaa	ctg	gat	aac	gca	gga	caa	att	1776				
Asn	Leu	Ile	Gly	Ser	Ser	Gln	Leu	Glu	Leu	Asp	Asn	Ala	Gly	Gln	Ile					
			580					585					590							
atc	agt	cag	gaa	gag	tat	tat	cca	ttt	ggc	ggc	aca	gca	tta	tgg	gca	1824				
Ile	Ser	Gln	Glu	Glu	Tyr	Tyr	Pro	Phe	Gly	Gly	Thr	Ala	Leu	Trp	Ala					
		595					600					605								
gca	aga	aac	caa	ata	gaa	gcc	agc	tac	aaa	atc	ctc	cgt	tac	tca	ggg	1872				
Ala	Arg	Asn	Gln	Ile	Glu	Ala	Ser	Tyr	Lys	Ile	Leu	Arg	Tyr	Ser	Gly					
	610					615					620									
aaa	gaa	cgc	gat	gct	acc	ggg	ctc	tat	tat	tac	ggc	tac	cgc	tat	tat	1920				
Lys	Glu	Arg	Asp	Ala	Thr	Gly	Leu	Tyr	Tyr	Tyr	Gly	Tyr	Arg	Tyr	Tyr					
	625				630					635					640					
cag	ccg	tgg	gtt	ggg	agg	tgg	tta	agc	gcc	gat	ccg	gct	gga	aca	atc	1968				
Gln	Pro	Trp	Val	Gly	Arg	Trp	Leu	Ser	Ala	Asp	Pro	Ala	Gly	Thr	Ile					
				645					650					655						
gat	gga	ctg	aat	cta	tac	cgg	atg	gtg	aga	aat	aat	ccg	tca	aca	ctg	2016				
Asp	Gly	Leu	Asn	Leu	Tyr	Arg	Met	Val	Arg	Asn	Asn	Pro	Ser	Thr	Leu					
			660					665					670							
gtt	gat	att	tct	ggg	ctt	gca	cct	acg	aaa	tac	aat	att	ccc	gga	ttt	2064				
Val	Asp	Ile	Ser	Gly	Leu	Ala	Pro	Thr	Lys	Tyr	Asn	Ile	Pro	Gly	Phe					
		675					680					685								
gac	ttt	gat	gta	gaa	ata	gat	gag	caa	aaa	aga	tct	aaa	tta	aaa	cca	2112				
Asp	Phe	Asp	Val	Glu	Ile	Asp	Glu	Gln	Lys	Arg	Ser	Lys	Leu	Lys	Pro					
	690					695					700									
acg	ttg	ata	aga	atc	aaa	gat	gaa	ttt	tta	cat	tat	ggg	cct	gta	gat	2160				
Thr	Leu	Ile	Arg	Ile	Lys	Asp	Glu	Phe	Leu	His	Tyr	Gly	Pro	Val	Asp					
	705				710					715					720					
aag	ctg	tta	gaa	gaa	aaa	aaa	ccc	ggc	ctc	aat	gta	cca	gag	gag	cta	2208				
Lys	Leu	Leu	Glu	Glu	Lys	Lys	Pro	Gly	Leu	Asn	Val	Pro	Glu	Glu	Leu					
				725					730					735						
ttt	gat	aga	ggg	cca	tcc	gag	aat	gga	gtg	tca	aca	tta	act	ttc	aaa	2256				
Phe	Asp	Arg	Gly	Pro	Ser	Glu	Asn	Gly	Val	Ser	Thr	Leu	Thr	Phe	Lys					
			740					745					750							
aaa	gac	cta	ccg	ata	agt	tgt	att	agc	aac	aca	gaa	tat	acc	ctt	gat	2304				
Lys	Asp	Leu	Pro	Ile	Ser	Cys	Ile	Ser	Asn	Thr	Glu	Tyr	Thr	Leu	Asp					
		755					760					765								
atc	tta	tac	aac	aaa	cat	gag	act	aaa	cca	ttc	cct	tac	gaa	aac	gaa	2352				
Ile	Leu	Tyr	Asn	Lys	His	Glu	Thr	Lys	Pro	Phe	Pro	Tyr	Glu	Asn	Glu					

770	775	780	
gca aca gtt ggc gca gat ctg gga gta ata atg tcc gtg gag ttt gga Ala Thr Val Gly Ala Asp Leu Gly Val Ile Met Ser Val Glu Phe Gly 785 790 795 800			2400
aat aaa tca ata ggt aat gcc tct gac gaa gat tta aaa gaa gaa cat Asn Lys Ser Ile Gly Asn Ala Ser Asp Glu Asp Leu Lys Glu Glu His 805 810 815			2448
ctc cca tta gga aaa tcc aca atg gat aaa aca gac ctg cca gat tta Leu Pro Leu Gly Lys Ser Thr Met Asp Lys Thr Asp Leu Pro Asp Leu 820 825 830			2496
aaa caa ggg cta atg atc gcg gag aag ata aaa agt gga aaa ggg gca Lys Gln Gly Leu Met Ile Ala Glu Lys Ile Lys Ser Gly Lys Gly Ala 835 840 845			2544
tat cct ttt cat ttt ggt gct gca ata gct gtt gta tat ggt gag gat Tyr Pro Phe His Phe Gly Ala Ala Ile Ala Val Val Tyr Gly Glu Asp 850 855 860			2592
aaa aaa gta gcc gct tca att ctg aca gat tta tct gaa cct aaa aga Lys Lys Val Ala Ala Ser Ile Leu Thr Asp Leu Ser Glu Pro Lys Arg 865 870 875 880			2640
gac gaa ggc gag tat ttg caa agt acg aga aag gta agc gca atg ttt Asp Glu Gly Glu Tyr Leu Gln Ser Thr Arg Lys Val Ser Ala Met Phe 885 890 895			2688
atc aca aac gtc aat gaa ttt cgc ggc cat gat tac cca aaa agt aaa Ile Thr Asn Val Asn Glu Phe Arg Gly His Asp Tyr Pro Lys Ser Lys 900 905 910			2736
tat agt atc gga tta gtt aca gct gaa aaa cgt cag cca gta ata agc Tyr Ser Ile Gly Leu Val Thr Ala Glu Lys Arg Gln Pro Val Ile Ser 915 920 925			2784
aaa aaa cgt gca aac ccg gaa gag gcc cct tca tca tcc aga aat aaa Lys Lys Arg Ala Asn Pro Glu Glu Ala Pro Ser Ser Ser Arg Asn Lys 930 935 940			2832
aaa ttg cat gta cat taa Lys Leu His Val His 945			2850

&lt;210&gt; 14

&lt;211&gt; 949

&lt;212&gt; PRT

&lt;213&gt; Photorhabdus luminescens

&lt;400&gt; 14

Met Lys Asn Ile Asp Pro Lys Leu Tyr Gln His Thr Pro Thr Val Asn 1 5 10 15
Val Tyr Asp Asn Arg Gly Leu Thr Ile Arg Asn Ile Asp Phe His Arg 20 25 30
Asp Val Ala Gly Gly Asp Thr Asp Thr Arg Ile Thr Arg His Gln Tyr 35 40 45

Asp Thr Arg Gly His Leu Ser Gln Ser Ile Asp Pro Arg Leu Tyr Asp  
 50 55 60  
 Ala Lys Gln Thr Asn Asn Ser Thr Asn Pro Asn Phe Leu Trp Gln Tyr  
 65 70 75 80  
 Asn Leu Thr Gly Asp Thr Leu Arg Thr Glu Ser Val Asp Ala Gly Arg  
 85 90 95  
 Thr Val Ala Leu Asn Asp Ile Glu Gly Arg Gln Val Leu Ile Val Thr  
 100 105 110  
 Ala Thr Gly Ala Ile Gln Thr Arg Gln Tyr Glu Ala Asn Thr Leu Pro  
 115 120 125  
 Gly Arg Leu Leu Ser Val Ser Glu Gln Ala Pro Gly Glu Gln Thr Pro  
 130 135 140  
 Arg Val Thr Glu His Phe Ile Trp Ala Gly Asn Thr Gln Ala Glu Lys  
 145 150 155 160  
 Asp His Asn Leu Ala Gly Gln Tyr Val Arg His Tyr Asp Thr Ala Gly  
 165 170 175  
 Val Thr Gln Leu Glu Ser Leu Ser Leu Thr Glu Asn Ile Leu Ser Gln  
 180 185 190  
 Ser Arg Gln Leu Leu Ala Asp Gly Gln Glu Ala Asp Trp Thr Gly Asn  
 195 200 205  
 Asp Glu Thr Leu Trp Gln Thr Lys Leu Asn Ser Glu Thr Tyr Thr Thr  
 210 215 220  
 Gln Ser Thr Phe Asp Ala Thr Gly Ala Leu Leu Thr Gln Thr Asp Ala  
 225 230 235 240  
 Lys Gly Asn Met Gln Arg Leu Ala Tyr Asn Val Ala Gly Gln Leu Gln  
 245 250 255  
 Gly Ser Trp Leu Thr Leu Lys Asn Gln Ser Glu Gln Val Ile Val Lys  
 260 265 270  
 Ser Leu Thr Tyr Ser Ala Ala Gly Gln Lys Leu Arg Glu Glu His Gly  
 275 280 285  
 Asn Gly Val Ile Thr Glu Tyr Ser Tyr Glu Pro Glu Thr Leu Arg Leu  
 290 295 300  
 Ile Gly Thr Thr Thr Arg Arg Gln Ser Asp Ser Lys Val Leu Gln Asp  
 305 310 315 320  
 Leu Arg Tyr Glu His Asp Pro Val Gly Asn Ile Ile Ser Val Arg Asn  
 325 330 335  
 Asp Ala Glu Ala Thr Arg Phe Trp Arg Asn Gln Lys Ile Val Pro Glu  
 340 345 350  
 Asn Thr Tyr Thr Tyr Asp Ser Leu Tyr Gln Leu Ile Ser Ala Thr Gly  
 355 360 365  
 Arg Glu Met Ala Asn Ile Gly Gln Gln Ser Asn Gln Leu Pro Ser Pro  
 370 375 380

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Ile Ile Pro Leu Pro Thr Asp Glu Asn Ser Tyr Thr Asn Tyr Thr Arg
385                               390                               395                               400

Ser Tyr Asn Tyr Asp Arg Gly Gly Asn Leu Val Gln Ile Arg His Ser
                               405                               410                               415

Ser Pro Ala Ala Gln Asn Asn Tyr Thr Thr Asp Ile Thr Val Ser Asn
                               420                               425                               430

Arg Ser Asn Arg Ala Val Leu Ser Ser Leu Thr Ser Asp Pro Thr Gln
                               435                               440                               445

Val Glu Ala Leu Phe Asp Ala Gly Gly His Gln Thr Lys Leu Leu Pro
450                               455                               460

Gly Gln Glu Leu Ser Trp Asn Thr Arg Gly Glu Leu Lys Gln Val Thr
465                               470                               475                               480

Pro Val Ser Arg Glu Ser Ala Ser Asp Arg Glu Trp Tyr Arg Tyr Gly
                               485                               490                               495

Asn Asp Gly Met Arg Arg Leu Lys Val Ser Glu Gln Gln Thr Gly Asn
                               500                               505                               510

Ser Thr Gln Gln Gln Arg Val Thr Tyr Leu Pro Asp Leu Glu Leu Arg
                               515                               520                               525

Thr Thr Gln Asn Gly Thr Thr Thr Ser Glu Asp Leu His Ala Ile Thr
530                               535                               540

Val Gly Ala Ala Gly His Ala Gln Val Arg Val Leu His Trp Glu Thr
545                               550                               555                               560

Thr Pro Pro Ala Gly Ile Asn Asn Asn Gln Leu Arg Tyr Ser Tyr Asp
                               565                               570                               575

Asn Leu Ile Gly Ser Ser Gln Leu Glu Leu Asp Asn Ala Gly Gln Ile
                               580                               585                               590

Ile Ser Gln Glu Glu Tyr Tyr Pro Phe Gly Gly Thr Ala Leu Trp Ala
595                               600                               605

Ala Arg Asn Gln Ile Glu Ala Ser Tyr Lys Ile Leu Arg Tyr Ser Gly
610                               615                               620

Lys Glu Arg Asp Ala Thr Gly Leu Tyr Tyr Tyr Gly Tyr Arg Tyr Tyr
625                               630                               635                               640

Gln Pro Trp Val Gly Arg Trp Leu Ser Ala Asp Pro Ala Gly Thr Ile
                               645                               650                               655

Asp Gly Leu Asn Leu Tyr Arg Met Val Arg Asn Asn Pro Ser Thr Leu
                               660                               665                               670

Val Asp Ile Ser Gly Leu Ala Pro Thr Lys Tyr Asn Ile Pro Gly Phe
675                               680                               685

Asp Phe Asp Val Glu Ile Asp Glu Gln Lys Arg Ser Lys Leu Lys Pro
690                               695                               700

Thr Leu Ile Arg Ile Lys Asp Glu Phe Leu His Tyr Gly Pro Val Asp
705                               710                               715                               720

Lys Leu Leu Glu Glu Lys Lys Pro Gly Leu Asn Val Pro Glu Glu Leu

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725										730					735				
Phe	Asp	Arg	Gly	Pro	Ser	Glu	Asn	Gly	Val	Ser	Thr	Leu	Thr	Phe	Lys				
			740					745					750						
Lys	Asp	Leu	Pro	Ile	Ser	Cys	Ile	Ser	Asn	Thr	Glu	Tyr	Thr	Leu	Asp				
		755					760					765							
Ile	Leu	Tyr	Asn	Lys	His	Glu	Thr	Lys	Pro	Phe	Pro	Tyr	Glu	Asn	Glu				
	770					775					780								
Ala	Thr	Val	Gly	Ala	Asp	Leu	Gly	Val	Ile	Met	Ser	Val	Glu	Phe	Gly				
785					790					795					800				
Asn	Lys	Ser	Ile	Gly	Asn	Ala	Ser	Asp	Glu	Asp	Leu	Lys	Glu	Glu	His				
				805					810					815					
Leu	Pro	Leu	Gly	Lys	Ser	Thr	Met	Asp	Lys	Thr	Asp	Leu	Pro	Asp	Leu				
			820					825					830						
Lys	Gln	Gly	Leu	Met	Ile	Ala	Glu	Lys	Ile	Lys	Ser	Gly	Lys	Gly	Ala				
		835					840					845							
Tyr	Pro	Phe	His	Phe	Gly	Ala	Ala	Ile	Ala	Val	Val	Tyr	Gly	Glu	Asp				
	850					855					860								
Lys	Lys	Val	Ala	Ala	Ser	Ile	Leu	Thr	Asp	Leu	Ser	Glu	Pro	Lys	Arg				
865					870					875					880				
Asp	Glu	Gly	Glu	Tyr	Leu	Gln	Ser	Thr	Arg	Lys	Val	Ser	Ala	Met	Phe				
				885					890					895					
Ile	Thr	Asn	Val	Asn	Glu	Phe	Arg	Gly	His	Asp	Tyr	Pro	Lys	Ser	Lys				
			900					905					910						
Tyr	Ser	Ile	Gly	Leu	Val	Thr	Ala	Glu	Lys	Arg	Gln	Pro	Val	Ile	Ser				
		915					920					925							
Lys	Lys	Arg	Ala	Asn	Pro	Glu	Glu	Ala	Pro	Ser	Ser	Ser	Arg	Asn	Lys				
	930					935					940								
Lys	Leu	His	Val	His															
945																			

&lt;210&gt; 15

&lt;211&gt; 2817

&lt;212&gt; DNA

&lt;213&gt; Photorhabdus luminescens

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(2814)

&lt;400&gt; 15

atg	gaa	aac	att	gac	cca	aaa	ctt	tat	cac	cat	acg	cct	acc	gtc	agt	
Met	Glu	Asn	Ile	Asp	Pro	Lys	Leu	Tyr	His	His	Thr	Pro	Thr	Val	Ser	
1				5					10					15		

48

gtt	cac	gat	aac	cgt	gga	cta	gct	atc	cgt	aat	att	agt	ttt	cac	cgc	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--

96

Val	His	Asp	Asn	Arg	Gly	Leu	Ala	Ile	Arg	Asn	Ile	Ser	Phe	His	Arg		
			20					25					30				
act	acc	gca	gaa	gca	aat	acc	gat	acc	cgt	att	acc	cgc	cat	caa	tat		144
Thr	Thr	Ala	Glu	Ala	Asn	Thr	Asp	Thr	Arg	Ile	Thr	Arg	His	Gln	Tyr		
		35					40					45					
aat	gcc	ggc	gga	tat	ttg	aac	caa	agc	att	gat	cct	cgc	ctg	tat	gac		192
Asn	Ala	Gly	Gly	Tyr	Leu	Asn	Gln	Ser	Ile	Asp	Pro	Arg	Leu	Tyr	Asp		
	50					55					60						
gcc	aaa	cag	act	aac	aac	gct	gta	caa	ccg	aat	ttt	atc	tgg	cga	cat		240
Ala	Lys	Gln	Thr	Asn	Asn	Ala	Val	Gln	Pro	Asn	Phe	Ile	Trp	Arg	His		
65					70					75					80		
aat	ttg	acc	ggc	aat	atc	ctg	cga	aca	gag	agc	gtc	gat	gcc	ggg	cgg		288
Asn	Leu	Thr	Gly	Asn	Ile	Leu	Arg	Thr	Glu	Ser	Val	Asp	Ala	Gly	Arg		
				85					90					95			
acg	att	acc	ctc	aac	gat	att	gaa	ggc	cgc	ccg	gtg	ttg	acc	atc	aat		336
Thr	Ile	Thr	Leu	Asn	Asp	Ile	Glu	Gly	Arg	Pro	Val	Leu	Thr	Ile	Asn		
			100					105					110				
gca	gcc	ggg	gtc	cgg	caa	aac	cat	cgc	tac	gaa	gat	aac	acc	ctg	ccc		384
Ala	Ala	Gly	Val	Arg	Gln	Asn	His	Arg	Tyr	Glu	Asp	Asn	Thr	Leu	Pro		
		115					120					125					
ggg	cgc	ctg	ctc	gct	atc	agc	gaa	caa	gga	cag	gca	gaa	gag	aaa	acg		432
Gly	Arg	Leu	Leu	Ala	Ile	Ser	Glu	Gln	Gly	Gln	Ala	Glu	Glu	Lys	Thr		
	130					135					140						
acc	gag	cgc	ctt	atc	tgg	gcc	ggc	aat	acg	ccg	caa	gaa	aaa	gac	cac		480
Thr	Glu	Arg	Leu	Ile	Trp	Ala	Gly	Asn	Thr	Pro	Gln	Glu	Lys	Asp	His		
	145				150					155					160		
aac	ctt	gcc	ggg	cag	tgc	gtc	cgc	cat	tac	gat	acc	gca	gga	ctc	act		528
Asn	Leu	Ala	Gly	Gln	Cys	Val	Arg	His	Tyr	Asp	Thr	Ala	Gly	Leu	Thr		
				165					170					175			
caa	ctc	aac	agc	ctt	gcc	ctg	acc	ggc	gcc	gtt	cta	tca	caa	tct	caa		576
Gln	Leu	Asn	Ser	Leu	Ala	Leu	Thr	Gly	Ala	Val	Leu	Ser	Gln	Ser	Gln		
			180					185					190				
caa	ctg	ctt	acc	gat	aac	cag	gat	gcc	gac	tgg	aca	ggg	gaa	gac	cag		624
Gln	Leu	Leu	Thr	Asp	Asn	Gln	Asp	Ala	Asp	Trp	Thr	Gly	Glu	Asp	Gln		
		195					200					205					
agc	ctc	tgg	caa	caa	aaa	ctg	agt	agt	gat	gtc	tat	atc	acc	caa	agt		672
Ser	Leu	Trp	Gln	Gln	Lys	Leu	Ser	Ser	Asp	Val	Tyr	Ile	Thr	Gln	Ser		
	210					215					220						
aac	act	gat	gcc	acc	ggg	gct	tta	ctg	acc	cag	acc	gat	gcc	aaa	ggc		720
Asn	Thr	Asp	Ala	Thr	Gly	Ala	Leu	Leu	Thr	Gln	Thr	Asp	Ala	Lys	Gly		
	225				230					235				240			
aac	att	cag	cgg	ctg	gcc	tat	gat	gtg	gcc	ggg	cag	cta	aaa	ggg	agt		768
Asn	Ile	Gln	Arg	Leu	Ala	Tyr	Asp	Val	Ala	Gly	Gln	Leu	Lys	Gly	Ser		
				245				250						255			
tgg	tta	aca	ctc	aaa	ggg	cag	gag	gaa	cag	gtg	att	atc	aaa	tcg	cta		816
Trp	Leu	Thr	Leu	Lys	Gly	Gln	Ala	Glu	Gln	Val	Ile	Ile	Lys	Ser	Leu		
			260					265					270				
acc	tac	tcc	gcc	gcc	ggg	caa	aaa	tta	cgt	gaa	gag	cac	ggg	aac	ggg		864



Thr	Tyr	Ser	Ala	Ala	Gly	Gln	Lys	Leu	Arg	Glu	Glu	His	Gly	Asn	Gly	
		275					280					285				
att	gtc	act	gaa	tac	agc	tac	gaa	ccg	gaa	acc	caa	cgg	ctt	atc	ggc	912
Ile	Val	Thr	Glu	Tyr	Ser	Tyr	Glu	Pro	Glu	Thr	Gln	Arg	Leu	Ile	Gly	
	290					295					300					
att	acc	act	cgc	cgt	cca	tca	gac	gcc	aag	gtg	ttg	caa	gac	cta	cgc	960
Ile	Thr	Thr	Arg	Arg	Pro	Ser	Asp	Ala	Lys	Val	Leu	Gln	Asp	Leu	Arg	
305					310					315					320	
tat	caa	tat	gac	cca	gta	ggc	aat	gtc	att	agt	atc	cgt	aat	gat	gcg	1008
Tyr	Gln	Tyr	Asp	Pro	Val	Gly	Asn	Val	Ile	Ser	Ile	Arg	Asn	Asp	Ala	
				325					330					335		
gaa	gcc	act	cgc	ttt	tgg	cgc	aat	cag	aaa	gta	gcc	ccg	gag	aat	agc	1056
Glu	Ala	Thr	Arg	Phe	Trp	Arg	Asn	Gln	Lys	Val	Ala	Pro	Glu	Asn	Ser	
			340					345					350			
tat	acc	tac	gat	tcc	ctg	tat	cag	ctt	atc	agc	gcc	acc	ggg	cgc	gag	1104
Tyr	Thr	Tyr	Asp	Ser	Leu	Tyr	Gln	Leu	Ile	Ser	Ala	Thr	Gly	Arg	Glu	
		355					360					365				
atg	gcc	aat	atc	ggt	cag	caa	agc	aac	caa	ctt	ccc	tct	ccg	gcg	cta	1152
Met	Ala	Asn	Ile	Gly	Gln	Gln	Ser	Asn	Gln	Leu	Pro	Ser	Pro	Ala	Leu	
	370				375						380					
cct	tct	gat	aac	aat	acc	tac	acc	aac	tat	act	cgc	act	tat	act	tat	1200
Pro	Ser	Asp	Asn	Asn	Thr	Tyr	Thr	Asn	Tyr	Thr	Arg	Thr	Tyr	Thr	Tyr	
385					390					395					400	
gac	cgt	ggc	ggc	aat	ttg	acg	aaa	att	cag	cat	agt	tca	cca	gcc	gcg	1248
Asp	Arg	Gly	Gly	Asn	Leu	Thr	Lys	Ile	Gln	His	Ser	Ser	Pro	Ala	Ala	
				405					410					415		
caa	aat	aac	tac	acg	acg	gat	ata	acg	gtt	tca	aat	cgc	agc	aac	cgc	1296
Gln	Asn	Asn	Tyr	Thr	Thr	Asp	Ile	Thr	Val	Ser	Asn	Arg	Ser	Asn	Arg	
			420				425					430				
gcg	gta	ctc	agc	aca	ttg	acc	gca	gat	cca	act	caa	gtc	gat	gcc	tta	1344
Ala	Val	Leu	Ser	Thr	Leu	Thr	Ala	Asp	Pro	Thr	Gln	Val	Asp	Ala	Leu	
		435					440					445				
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Ala 65	Lys	Gln	Thr	Asn	Asn 70	Ala	Val	Gln	Pro	Asn 75	Phe	Ile	Trp	Arg	His 80	

Asn Leu Thr Gly Asn Ile Leu Arg Thr Glu Ser Val Asp Ala Gly Arg  
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 Thr Ile Thr Leu Asn Asp Ile Glu Gly Arg Pro Val Leu Thr Ile Asn  
                     100                    105                    110  
 Ala Ala Gly Val Arg Gln Asn His Arg Tyr Glu Asp Asn Thr Leu Pro  
                     115                    120                    125  
 Gly Arg Leu Leu Ala Ile Ser Glu Gln Gly Gln Ala Glu Glu Lys Thr  
                     130                    135                    140  
 Thr Glu Arg Leu Ile Trp Ala Gly Asn Thr Pro Gln Glu Lys Asp His  
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 Asn Leu Ala Gly Gln Cys Val Arg His Tyr Asp Thr Ala Gly Leu Thr  
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 Gln Leu Asn Ser Leu Ala Leu Thr Gly Ala Val Leu Ser Gln Ser Gln  
                     180                    185                    190  
 Gln Leu Leu Thr Asp Asn Gln Asp Ala Asp Trp Thr Gly Glu Asp Gln  
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 Ser Leu Trp Gln Gln Lys Leu Ser Ser Asp Val Tyr Ile Thr Gln Ser  
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 Asn Thr Asp Ala Thr Gly Ala Leu Leu Thr Gln Thr Asp Ala Lys Gly  
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 Asn Ile Gln Arg Leu Ala Tyr Asp Val Ala Gly Gln Leu Lys Gly Ser  
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 Thr Tyr Ser Ala Ala Gly Gln Lys Leu Arg Glu Glu His Gly Asn Gly  
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 Ile Val Thr Glu Tyr Ser Tyr Glu Pro Glu Thr Gln Arg Leu Ile Gly  
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 Ile Thr Thr Arg Arg Pro Ser Asp Ala Lys Val Leu Gln Asp Leu Arg  
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 Tyr Gln Tyr Asp Pro Val Gly Asn Val Ile Ser Ile Arg Asn Asp Ala  
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 Glu Ala Thr Arg Phe Trp Arg Asn Gln Lys Val Ala Pro Glu Asn Ser  
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 Tyr Thr Tyr Asp Ser Leu Tyr Gln Leu Ile Ser Ala Thr Gly Arg Glu  
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 Pro Ser Asp Asn Asn Thr Tyr Thr Asn Tyr Thr Arg Thr Tyr Thr Tyr  
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Lys	Thr	Ile	Arg	Tyr	Ser	Gly	Lys	Glu	Arg	Asp	Val	Thr	Gly	Leu	Tyr		
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Gln	Arg	Ala	Ile	Ala	Ala	Gln	Thr	Glu	Gln	Glu	Ala	His	Glu	Ser	Leu		
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